AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT 1. CONTRACT		ONTRACT ID C	ODE	PAGE OF			
2 MODIFICATION NO .	2 EEEECTIVE DATE	4 DEOLUCITION/DUDGUAS	E DEC) NO	DDOJECT N	1 (If applies the	19
2. MODIFICATION NO.:	3. EFFECTIVE DATE	4. REQUISITION/PURCHAS	E KE(Į. NO.	PROJECT N	O. (If applicab	ie)
0004	JAN 10, 2003	W81W3G-203	35-71	81			
6. ISSUED BY CODE CA31 7. ADMINISTERED BY: Contracting Division, Contracts Branch CENAB-CT-C 10 S. Howard ST. Room 7000 Baltimore MD 21203-1715 Baltimore MD 21203-1715			E1P0100				
8. NAME AND ADDRESS OF CONTRACTOR (No., st	reet, county, State and ZIP Co	ode)	(x)	9A. AMENDN	MENT OF SOI	LICITATION	NO.
				DACW31-0	02-R-0044		
			X	9B. DATED (SEE ITEM 11) NOV 12, 2002			
				10A. MODIFI NO.	CATION OF	CONTRACT/	ORDER
				10B. DATED	(SEE ITEM 13	3)	
CODE	FACILITY CODE		<u> </u>				
11. THIS	SITEM ONLY APPLIES TO	O AMENDMENTS OF SOLI	CITA	TIONS			
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. ACCOUNTING AND APPROPRIATION DATA (I		ODJETCI TIONG OF CONTRA	CITIC (C	ADDED C			
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.							
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER No. ITEM 10A			ORDER				
B. THE ABOVE NUMBERED CONTRACT/OR appropriation date, etc.) SET FORTH IN ITEM	RDER IS MODIFIED TO RE 1 14, PURSUANT TO THE A	FLECT THE ADMINISTRATI AUTHORITY OF FAR43.103(b	IVE CI	HANGES (such	as changes in	paying office,	
C. THIS SUPPLEMENTAL AGREEMENT IS I	ENTERED INTO PURSUAN	T TO AUTHORITY OF: chang	ges clai	ise FAR 52.243.	.1		
D. OTHER (Specify type of modification and authority)							
E. IMPORTANT: Contractor is not, is required to sign this document and returncopies to the issuing office.							
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) BELL/LINCOLN MULTICULTURAL SCHOOL MODERNIZATION WASHINGTON, DC							
	SEE THE FOL	LOWING PAGES					

Except as provided herein, all terms and conditions of the	document referenced in Item 9	A or 10A, as heretofore changed, remains unchanged an	d in full force and effect	
15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED	
(signature of person authorized to sign)		BY(Signature of Contracting Officer)		
NSN 7540-01-152-8070 PREVIOUS EDITION UNUSABLE	30-	-105 STANDARD I Prescribed by C	FORM 30 (REV. 10-83) GSA	

FAR (48 CFR) 53.243

AMENDMENTS:

<u>DRAWINGS</u> (All references to Amendment 2 in drawing revision blocks shall be ignored. Drawings included with this amendment should read "Amendment No. 4):

- 1) AMENDMENT 0001, Sheet VOLUME 2 (Cover): Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated January 3, 2003.
- 2) AMENDMENT 0001, Sheet CS102: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated December 10, 2002.
- 3) AMENDMENT 0001, Sheet ENV101: Delete this sheet.
- 4) AMENDMENT 0001, Sheet ENV102: Delete this sheet.
- 5) AMENDMENT 0001, Sheet ENV103: Delete this sheet.
- 6) AMENDMENT 0001, Sheet ENV104: Delete this sheet.
- 7) AMENDMENT 0001, Sheet ENV105: Delete this sheet.
- 8) AMENDMENT 0001, Sheet ENV106: Delete this sheet.
- 9) AMENDMENT 0001, Sheet CG701: Storm Drain Design Data, MH-4 and MH-
- 5: Revise the from 60" to 48" as show on the plan.
- 10) AMENDMENT 0001, Sheet SB501: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 11) AMENDMENT 0001, Sheet SD101: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 12) AMENDMENT 0001, Sheet SD107: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 13) AMENDMENT 0001, Sheet SD116: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- 14) AMENDMENT 0001, Sheet SD121: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 15) AMENDMENT 0001, Sheet SF606: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 16) AMENDMENT 0001, Sheet SF607: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 17) AMENDMENT 0001, Sheet AF601, Color Schedule, Interior: The carpet floor finish has been identified three times. Any one of the three carpet manufacturers and colors will be approved for this project. There will be only one color carpet used.
- 18) AMENDMENT 0001, Sheet AF602: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 19) AMENDMENT 0001, Sheet AF603: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 20) AMENDMENT 0001, Sheet AP401: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 21) AMENDMENT 0001, Sheet AP410, Aluminum window frames numbered "F" and "Y": Delete the clear polycarbonate glazing from each of these window types.
- AMENDMENT 0001, Sheet AP601: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 23) AMENDMENT 0001, Sheet AE504: Plan details D1 & D2 are required to use common brick as a back up.
- 24) AMENDMENT 0001, Sheet AE316: Stair detail D1, delete the reference to rubber treads and risers.
- 25) AMENDMENT 0001, Sheet AI107: Locker Rooms E126 & E127; the "E" style locker height shall be increased from 60 inches to 72 inches in height. This height modification occurs only at these two rooms.

- AMENDMENT 0001, Sheet AI122: Elevation details E1, E2 & E3, delete the reference to shelving manufacture to be selected by the Owner. Refer to the specification 12627 for library furniture.
- AMENDMENT 0001, Sheet AI203: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 3 January 2003.
- 28) AMENDMENT 0001, Sheet AI204: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 3 January 2003.
- 29) AMENDMENT 0001, Sheet AI205: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 3 January 2003.
- 30) AMENDMENT 0001, Sheet MH101: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 31) AMENDMENT 0001, Sheet MH103: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 32) AMENDMENT 0001, Sheet MH104: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 33) AMENDMENT 0001, Sheet MH104b: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 34) AMENDMENT 0001, Sheet MH105: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 35) AMENDMENT 0001, Sheet MH106: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 36) AMENDMENT 0001, Sheet MH107: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- 37) AMENDMENT 0001, Sheet MH108: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 38) AMENDMENT 0001, Sheet MH109: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 39) AMENDMENT 0001, Sheet MH109B: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 40) AMENDMENT 0001, Sheet MH110: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 41) AMENDMENT 0001, Sheet MH111: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 42) AMENDMENT 0001, Sheet MH112: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 43) AMENDMENT 0001, Sheet MH113: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 44) AMENDMENT 0001, Sheet MH114: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 45) AMENDMENT 0001, Sheet MH115: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 46) AMENDMENT 0001, Sheet MH117: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 47) AMENDMENT 0001, Sheet MH304: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- 48) AMENDMENT 0001, Sheet MH403: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 49) AMENDMENT 0001, Sheet MH404: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 50) AMENDMENT 0001, Sheet MH502: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 51) AMENDMENT 0001, Sheet MH503: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 52) AMENDMENT 0001, Sheet MH504: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 53) AMENDMENT 0001, Sheet MH602: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 54) AMENDMENT 0001, Sheet MH603: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 55) AMENDMENT 0001, Sheet MH604: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 56) AMENDMENT 0001, Sheet MP106: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 57) AMENDMENT 0001, Sheet MP107: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 58) AMENDMENT 0001, Sheet MP108: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- 59) AMENDMENT 0001, Sheet MP110: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 60) AMENDMENT 0001, Sheet MP112: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 61) AMENDMENT 0001, Sheet MP113: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 62) AMENDMENT 0001, Sheet MP401: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 63) AMENDMENT 0001, Sheet PL001: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 64) AMENDMENT 0001, Sheet PL106: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 65) AMENDMENT 0001, Sheet PL503: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 66) AMENDMENT 0001, Sheet PL605: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 67) AMENDMENT 0001, Sheet PL 608: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 68) AMENDMENT 0001, Sheet E001: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 69) AMENDMENT 0001, Sheet EL101: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- 70) AMENDMENT 0001, Sheet EL103: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 71) AMENDMENT 0001, Sheet EL104: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 72) AMENDMENT 0001, Sheet EL104B: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 73) AMENDMENT 0001, Sheet EL105: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 74) AMENDMENT 0001, Sheet EL106: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 75) AMENDMENT 0001, Sheet EL107: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 76) AMENDMENT 0001, Sheet EL108: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 77) AMENDMENT 0001, Sheet EL109: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 78) AMENDMENT 0001, Sheet EL110: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 79) AMENDMENT 0001, Sheet EL111: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 80) AMENDMENT 0001, Sheet EL112: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- AMENDMENT 0001, Sheet EL113: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 82) AMENDMENT 0001, Sheet EL114: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 83) AMENDMENT 0001, Sheet EL115: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 84) AMENDMENT 0001, Sheet EL116: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 85) AMENDMENT 0001, Sheet EP101: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 86) AMENDMENT 0001, Sheet EP102: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 87) AMENDMENT 0001, Sheet EP103: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 88) AMENDMENT 0001, Sheet EP104: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 89) AMENDMENT 0001, Sheet EP104B: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 90) AMENDMENT 0001, Sheet EP105: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 91) AMENDMENT 0001, Sheet EP106: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- 92) AMENDMENT 0001, Sheet EP107: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 93) AMENDMENT 0001, Sheet EP108: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 94) AMENDMENT 0001, Sheet EP109B: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 95) AMENDMENT 0001, Sheet EP110: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- AMENDMENT 0001, Sheet EP111: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 97) AMENDMENT 0001, Sheet EP112: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like ed sheet, dated 10 December 2002.
- 98) AMENDMENT 0001, Sheet EP113: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 99) AMENDMENT 0001, Sheet EP114: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 100) AMENDMENT 0001, Sheet EP115: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 101) AMENDMENT 0001, Sheet EP116: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 102) AMENDMENT 0001, Sheet EP117: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- 103) AMENDMENT 0001, Sheet EP401: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 104) AMENDMENT 0001, Sheet EP402: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 105) AMENDMENT 0001, Sheet EP403: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 106) AMENDMENT 0001, Sheet EP601: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 107) AMENDMENT 0001, Sheet EP602: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 108) AMENDMENT 0001, Sheet EP603: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 109) AMENDMENT 0001, Sheet EP605: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 110) AMENDMENT 0001, Sheet EP607: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 111) AMENDMENT 0001, Sheet EP611: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 112) AMENDMENT 0001, Sheet EP612: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 113) AMENDMENT 0001, Sheet EP613: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- 114) AMENDMENT 0001, Sheet EP614: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 115) AMENDMENT 0001, Sheet EP615: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 116) AMENDMENT 0001, Sheet EP616: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 117) AMENDMENT 0001, Sheet EP617: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 118) AMENDMENT 0001, Sheet EP618: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 119) AMENDMENT 0001, Sheet EP619: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 120) AMENDMENT 0001, Sheet EP620: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 121) AMENDMENT 0001, Sheet EP621: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 122) AMENDMENT 0001, Sheet EP622: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 123) AMENDMENT 0001, Sheet EP623: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 124) AMENDMENT 0001, Sheet EP624: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.

- 125) AMENDMENT 0001, Sheet EP625: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 126) AMENDMENT 0001, Sheet EP626: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 127) AMENDMENT 0001, Sheet EP627: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 128) AMENDMENT 0001, Sheet EY104: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 129) AMENDMENT 0001, Sheet EY109: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 130) AMENDMENT 0001, Sheet EY116: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 131) AMENDMENT 0001, Sheet EY601: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 132) AMENDMENT 0001, Sheet TY106: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 133) AMENDMENT 0001, Sheet TY108: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 134) AMENDMENT 0001, Sheet TY116: Delete this sheet as reissued in Amendment 0001 and substitute therefore the attached revised like numbered sheet, dated 10 December 2002.
- 135) Amendment 0001, Sheet IT117: Modify this sheet per attached Sketch IT117, dated 12/18/02.

136) Amendment 0001, Sheet IT120: Modify this sheet per attached Sketch IT120, dated 12/18/02.

SPECIFICATIONS:

- 137) Section 01050, Page 5, Paragraph 1.15: Delete this paragraph and substitute the following:
- "1.15 HAZARDOUS MATERIALS EXISTING BELL HIGH SCHOOL AND EXISTING LINCOLN MIDDLE SCHOOL

The removal of the hazardous material will be completed under a separate contract with the District of Columbia Public Schools (DCPS). It is the intent of DCPS-held contract to removed all hazardous materials from both buildings prior to the beginning of the building demolition by the general Contractor. As certain areas were inaccessible during the design for the hazardous materials abatement, the general Contractor will be responsible for the removal/disposal of the hazardous materials and shall ensure that all materials have been identified and removed prior to demolition of the structure. If needed, the hazardous materials abatement contractor shall include in his/her price the cost for a qualified third party (EPA accredited Asbestos Inspector) to sample and quantify additional materials not included in the original design."

- 138) Table of Contents: Delete the specification table of contents and substitute therefore the attached revised specification table of contents, dated January 3, 2003.
- 139) Section 01330, Submittal Register: Delete the submittal register in its entirety and substitute therefore the attached revised submittal register, dated January 3, 2003.
- 140) Section 02222, Asbestos Abatement: Delete this specification section.
- 141) Section 02223, Lead Hazard Control Activities: Delete this specification section.
- 142) Section 02224, Handling of Lighting Ballasts and Lamp Containing PCB's and Mercury: Delete this specification section.
- 143) Section 02225, Underground Storage Tank Removal: Delete this specification section.
- 144) Section 02226, Earthwork for Underground Storage Tanks, Ancillary Equipment and Utilities Systems: Delete this specification section.
- 145) Section 02227, Safety, Health and Emergency Response (HTRW/UST): Delete this specification section.

- 146) Section 02228, Chemical Quality Management: Delete this specification section.
- 147) Section 02900:
 - a) Paragraph 1.2 SUMMARY B: Delete items number B4 and B5.
- b) Paragraph 1.9 TREE AND SHRUB MAINTENANCE A: Delete items A2 and A3.
- c) Paragraph 1.10 GROUND COVER AND PLANT MAINTENANCE A: Delete items A2 and A3.
 - d) Paragraph 1.11 LAWN MAINTENANCE A: Delete items A3 and A4.
- e) Paragraph 3.24.A.9: Revise this sentence to read "Tags shall be removed by an authorized representative of the District of Columbia Public Schools.
- 148) Section 07511, BUILT-UP ASPHALT ROOFING, Page 5, Line 34: Revise the Cover Board thickness from ¾ inch to ½ inch.
- 149) Section 07620, COIL COATED GALVANIZED STEEL SHEET FINISH, Page 4, Line 26: Revise this line to read; "Galvanized Steel: 24 gage or 0.024 inch.".
- 150) Section 07811, SPRAYED FIRE-RESSISTIVE MATERIALS, Page 5, Line 3, Cementitious Sprayed Fire-Resistive Material: Add CAFCO 300, Isolatek International as an approved product and manufacturer.
- 151) Section 07841: Delete this specification section as issued and substitute therefore the attached revised like numbered specification, dated January 3, 2002.
- 152) Section 08410, ALUMINUM ENTRANCES AND STOREFRONT, Page 6, Line 22, Aluminum Finishes: Delete the reference to Class I Clear Anodic Finish as the finish color. The specified finish is a Duranar UC54412 Ivory (HP3) as identified on drawing AF601, General Color Schedule Notes.
- 153) Section 08520, ALUMINUM WINDOWS, Page 6, Line 1, Finishes: Delete the reference to Class I Clear Anodic Finish as the finish color. The specified finish is a Duranar UC54412 Ivory (HP3) as identified on drawing AF601, General Color Schedule Notes.
- 154) Section 08710, FINISH HARDWARE, Quality Assurance: Substitutions may be made for all products listed with in this specification as long as all products meet or exceed the standards set forth by ANSI/BHMA.

- 155) Section 10425: Delete this specification section as issued and substitute therefore the attached revised like numbered specification, dated January 3, 2002.
- 156) Section 11136: The Language Laboratory Equipment specified in this section shall be installed in Room A311 Language.
- 157) Section 12345, LABORATORY CASEWORK AND FIXTURES, Page 5, Line 64, Acid Resistant Plastic Laminate: Delete acid resistant plastic laminate from this specification section. All tops, back & end splashes are to be epoxy resin.
- 158) Section 12627: Add this attached new section.
- 159) Section 13851: Delete this section in its entirety as originally issued and substitute the attached revised like-numbered section, dated Dec 10, 2002.
- 160) Section 15852: Add this attached new section.
- 161) Section 15854: Add this attached new section.
- 162) Section 15949: Add this attached new section.
- 163) Section 15951: Add this attached new section.
- 164) Section 15952: Add this attached new section.
- 165) Section 15953: Add this attached new section.
- 166) Section 15954: Add this attached new section.
- 167) Section 15955: Add this attached new section.
- 168) Section 15958: Add this attached new section.
- 169) Section 15959: Add this attached new section.
- 170) Sections 16139 and 16511: Delete these sections in their entirety as originally issued and substitute the attached revised like-numbered sections, dated Dec 10, 2002.

DRAWINGS:

- 171) Sheet AI206: Add this attached sheet, dated 3 January 2003.
- 172) Sheet AI207: Add this attached sheet, dated 3 January 2003.
- 173) Sheet AI208: Add this attached sheet, dated 3 January 2003.
- 174) Sheet AI209: Add this attached sheet, dated 3 January 2003.
- 175) Sheet AI210: Add this attached sheet, dated 3 January 2003.
- 176) Sheet AI211: Add this attached sheet, dated 3 January 2003.
- 177) Sheet AI212: Add this attached sheet, dated 3 January 2003.
- 178) Sheet AI213: Add this attached sheet, dated 3 January 2003.
- 179) Sheet AI214: Add this attached sheet, dated 3 January 2003.
- 180) Sheet AI215: Add this attached sheet, dated 3 January 2003.

ATTACHMENTS:

Specifications:

Specification Table of Contents

Section 01330A, SUBMITTAL REGISTER

Section 07841, THROUGH PENETRATION FIRE STOP SYSTEMS

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A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	- NSTRUCT-ONS	S C // 1 E D M E S S S S S S S S S S S S S S S S S S		R 1	C E R T I F I C A T E S	SAMPLES	R E C O R	M A N U A	I N G G O V R E M R A N T O M E O L N Y T	A P	R Ш > − Ш ≥ Ш R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
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			01572	CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT																						
			1.3	Plan												G G										
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TITL	E AND	LOC	ATION BELL N	Multicultural High School reet & Irving Street, NW	and	l Li	nco	In M	lultic	ultu	ıral	Mic	ddl	e Scl	nool	CONT	FRACTOF	₹					SPE	CIFICATIO	N SECTION
			16 ^m Str Washir	reet & Irving Street, NW agton, DC																			017	20	
					TYP	E OF	SUB	MITTA	L					CL FIC	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GOV A	ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A S - Z G %	- Z Ø − H O C H − O Z Ø		S T A T E P O R T S	CERTIFICATES		R E C O R D S	O & M M A N U A L S	A T O I N	E V	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	О.	p.	q.	r.	S.	t.	u.	V.	w.	X.	y.	Z.	aa.
				AS-BUILT DRAWINGS - CADD																					
				SD-11 Closeout submittals																					
				Progress Plan											G										
				Final Requirements											G										
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TITL	E AND L	LOCA		Lincoln Multicultural High Snington, D.C.	Schoo	ol &	Mic	ddle	Sch	ool							CON	TRACTO	R						CIFICATIO 2080	ON SECTION
					TYF	PE OF	SUE	BMITT	AL	1	ı				CL FIC	ASSI- ATION			CONTRACT	OR ATES		CONTRA ACTI	CTOR ON	GOV	ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S		SCHEDULES	STATEMENTS	R E P O R T S	CERTIFICATES		RECORDS		N	E V	E V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
				Submittals Ding Through											FIO FIO	-										
				Pipe Threads Joining Materials											FIO	-										
				Transistian Fittings												-										
	-		2.4	Transistion Fittings			1	1							FIO FIO	1			+							
			2.5	Dielectric Fittings											FIO	+			+							
				Sleeves												+			+							
				Identification Devices											FIO FIO	1		1								
			2.8	Grout			-								FIO	-										-
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TITL	E AND L	OCA	TION Bell/l Wash	Lincoln Multicultural High S hington, D.C.	choo	ol &	Mic	ddle	Sch	iool								CONT	RACTOF	?						CIFICATIO 2100	N SECTION
					TYF	PE OF	F SUE	BMITT	AL	I	1				CL FIC	ASSI-	N			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GOV	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A S - Z G S		SCHEDULES	$S \vdash A \vdash \sqsubseteq S \boxminus Z \vdash S$	R E P O R T S	CERTIFICATES	S A M P L E S	RECORDS	O & M M A N U A L S	I N F O R M A T O N Y	M I E	A P P R O V E D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 3.1	e. General	f.	g.	h.	i.	j.	k.	l.	m.	n.	0.	p. FIO	q.	<u>-</u>	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
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TITLI	E AND L	OCA		Lincoln Multicultural High Sc nington, D.C.	choc	ol &	Mic	ldle S	Schoo	1						CON	FRACTOR	?						CIFICATIO 2122	N SECTION
					TYF	PE OF	SUB	MITTA	L	1	ı		1	FI	CLASSI- ICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO\	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	S C H	S T A T E E M P O R T T S S	CERTIFICATES		R E C O R D S	O & M M A N U A L S	F O R M A T I	G O V E P R P N R O N E V T D	R E V E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e. Tree Protection and Trimming	f.	g.	h. X	i.	j. k.	I.	m.	n.	0.	p.	. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
				Tree Protection and Thirlining	^		^			 ^						AN									
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TITL	E AND L	OCA		Lincoln Multicultural High Schington, D.C.	thool &	Mic	ldle S	•			,				CONT	RACTOF	₹					SPEC 022		N SECTION
					TYPE O	F SUE	MITTAI	-		1	ī	ı	CL FIC	ASSI- ATION			CONTRACTO SCHEDULE DA	OR \TES		CONTRA ACTIO	CTOR ON	GOV A	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D R A W I N G S	UCTIONS	CHEDULES	S T A T RE M P O R T T S S	A T E S	S A M P L E S		O & M M A N U A L S	N F O R M A T O N L N	E V N E T D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f. g.	h.	i.	j. k.	. l.	. m	. n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			02200	Earthwork (Building)n																				
			02200-1, line 39	Soil material Properties				X	(X		FIO		AR									
				Verification of footing sub-grade				X	(X		FIO		AR									
				In-place soil density tests				X	(X		FIO		AR									
			line 45	Moisture density for each soil type encountered				X	(X		FIO		AR									
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TITI	E AND L	OCA		Lincoln Multicultural High Shington, D.C.	choo	l & M	lidd	le Sc	hoo	1		•				CONT	RACTOR	2					SPE 022		N SECTION
					TYPI	E OF SI	JBM	ITTAL						CL/ FIC/	ASSI- ATION		;	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI			VERNMENT ACTION	
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			02221	Building Demolition																					
			02221-1,	Refrigerant Recovery	Х								X		G	AR									
			line 61	Technician	^								^												
			02221-1, line 61	Professional Engineer	X								X		G	AR									
			02221-1, line 63	Environmental Protection & Noise Control Measures	х								X		G	AR									
			02221-1, line 67	Schedule of Building Demolition Activities			х						X		G	AR									
			02221-2, line 8	Inventory of Removed 8 Salvaged Material	k				X				X		G	AR									
			02221-2, line 10	Pre-demolition Video Tape	х								X		G	AR									
			02221-2, line 14	Land Fill Records					X				X		G	AR									
			02221-2, line 17	Statement of Refrigeran Recovery	t			X					X		G	AR									

					S			AL RE 415-1-		ISTER									RACT NO. ACA 31-00-D-	0039
TITLE	AND LOCATIO	N	Bell/Lincoln Multicultural H Washington, D.C.	ligh School &	Mido				,			CC	NTRA(CTOR				SPEC 022 2	CIFICATION SE	ECTION
					TYPI	E OF S	UBMIT	TAL		CLASS FICATION	SI- ON			CONTRACTO SCHEDULE DA	OR ATES	L	CONTRACTOR ACTION	GC	OVERNMENT ACTION	
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					TYPE	OF S	UBMIT	TAL		CLASS FICATION	SI- ON			CONTRACTO SCHEDULE DA	OR ATES		CONTRACTOR ACTION	GC	OVERNMENT ACTION	
A C T I V I T Y	TRANS-MITTAL NO.	I T E M NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D	T S	S T A R F I I C R T I I I I I I I I I I I I I I I I I I	SR	O&M MARUALS	N F O	R P N R	E V I	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	SUBMIT TO GOVERN- MENT DATE	C O D E	DATE	REMARKS
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TITL	E AND LOCATIO	N	Bell/Lincoln Multicultural H Washington, D.C.	ligh School &	Mido				-,			CO	NTRA	CTOR				SPEC 022 2	CIFICATION SE	ECTION
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A C T I V I Y N O	TRANS-MITTAL NO.	- Т Е М N О.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	DRAWINGS DATA	N S T R U C T O N S		SR	M	O R M A T	G O V E P R P N R O V E P N T D	E V I E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	SUBMIT TO GOVERN- MENT DATE	C O D E	DATE	REMARKS
a.	b.	C.	d. 1.5	e. Submittals	f. g.		. k. l.	m. n.		p.	q.	r.	S.	t.	u.	٧.	w. x.	y.	Z.	aa.
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TITLI	E AND LOCATIO	N	Bell/Lincoln Multicultural H Washington, D.C.	ligh School &	Mido					,		CC	ONTRA	CTOR				SPEC 022	CIFICATION SI 25	ECTION
					TYPE	OF S	UBMI	TTAL		CLAS: FICATI	SI- ON			CONTRACTO SCHEDULE DA	OR ATES		CONTRACTOR ACTION	GC	OVERNMENT ACTION	
A C T I V I Y	TRANS-MITTAL NO.	I T E M NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D	T S	T ⁻	R T I F S F	O & M A N U A L S	N F O	R P N R	E V	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	SUBMIT TO GOVERN- MENT DATE	C O D E	DATE	REMARKS
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					TYPE	OF S	JBMI ⁻	TTAL	-		CLAS: FICATI	SI- ON		Т	CONTRACTO SCHEDULE DA	OR ATES	C	ONTRACTOR ACTION	G	OVERNMENT ACTION	
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TITL	E AND L	OCA	TION Bell/l Wasl	Lincoln Multicultural High Snington, D.C.	Schoo	ol &	Mic	ldle	School							CONT	RACTOR	2					SPE 022		N SECTION
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TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mic	ddle								CON	TRACTO	₹					SPE 02 2		N SECTION
					TYF	PE OF	SUB	MITT	AL I		1			FI	CLASSI- CATION	-		CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	- Z S - Z C O Z S	SCHEDULES	S T A T E E P O R T S S	CERTIFICATES	Α	RECORDS	O & M M A N U A L S	N F O R M A T I	GOVERPR ROVED	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 1.2	e. Submittals	f.	g.	h.	i.	j. k.		m.	n. x	0.	p. FIO		r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			1.2	Submittais	Х				Х	X		^		110	<u>'</u>										
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								SU	BMIT (E	T TA ER 4				ER										ITRACT NO DACA 31-0	
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle	Schoo	ol						CONT	RACTOR	2						CIFICATIO 2230	N SECTION
					TYF	PE OF	SUB	MITTA	AL I			1		F	CLASSI- FICATION		;	CONTRACTO SCHEDULE DA	OR .TES		CONTRA ACTI	CTOR ON	GO	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	SCHEDULES	S T A T E E P O R T S	C E R T I F I C A T E S	S	R E C O R D S	O & M M A N U A L S	NFORMATI	V A E P R P N R O M O N E V	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 02230	e. Site Clearing	f.	g.	h.	i.	j. k.	l.	m.	n.	0.	р	o. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			02230	Site Clearing																					
			1.5	Submittals										FI	IO										
																	1								
																	-								
																						1			
													1	1								1			
								+				+	-	+								1			
					1				-		+		-				1					1			

								SU	BMIT (E	TA l R 41			ST	ER										ITRACT NO DACA 31-0	
TIT	LE AND	LOCA	ATION Bell/Was	Lincoln Multicultural High S hington, D.C.	Scho	ol &	Mic	ddle	Schoo	ol						CONT	TRACTOR	?						CIFICATIO 2240	N SECTION
					TYF	PE OF	SUB	MITTA	AL I					FI	LASSI- CATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	- Z O - + O C A + O Z O	CHEDULE	S T A T E E P O R T T S	CERTIFICATES	SA	RECORDS	O & M M A N U A L S	1 1	GOVER PROVED	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 02240	e. Dewatering	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			1.3	Performance Requirements		_								FIC) G										
						1				1			1												
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						1				1															
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								SL	IBMI [*]	TTA ER 4				ΓΕΙ	R									ITRACT NO DACA 31-0	
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	. Mi	ddle	Scho	ol						CONT	TRACTOF	?						CIFICATIO 2260	N SECTION
					TYF	PE OF	SUE	BMITT	AL				1	$\overline{\perp}$	CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAS-RG%	I N S T R U C T I O N S	0 C H E D D L E 0	S T A T F E E M F F C N F T S S	CO A T E S S	s	R E C O R D S	O & M M A N U A L S	K N F C F N M M M M M M M M M M M M M M M M M M	F O V A E P	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	i. I.	m	. n.	0.	<u>.</u>	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
				Excavation Support and Protection																					
			2.1B	Structural Steel	X				X	-	X	+	+	+	G	AR									
				Steel Sheet Piling	$\frac{\lambda}{X}$				X		X			+	G	AR									
				Wood Lagging	X				X		X			+	G	AR									
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TITI	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	Scho	ol &	Mi	ddle	-			,				CON	TRACTO	₹						CIFICATIO 361	N SECTION
					TYF	PE OF	SUE	BMITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	I N S T R U C T I O N S	0 C T E D D L E 0	S T A T E M P O R T S	CERTIFICATES	s	RECORDS	& M	1 N	I	E V I E W E E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j. k.	. I.	m	. n.	0).	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			02361	Termite Control																					
			02361-2, line 28	Termiticide	X		x		x x	X			X	F	FIO G	AR									
														-											
													-												
													-	-								1			

								SU	BMI [*]	TTA ER 4			STE	ΞR											ITRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High So hington, D.C.	choo	ol &	Mic	ldle								C	CONT	RACTOR	₹					SPE	CIFICATIO 025	N SECTION 10
					TYP	E OF	SUBI	ATTIN	L			1		FI	LASSI- CATION	1			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T - > - T Y Z O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	- N S F R U C F - O Z S	S C	S T A T F E E M F C N T S S	C E R T I F I C A T E S	S A M P L	RECORDS	O & M A N U A L S		E R N M E L	APPROVED	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. l.	m.	n.	0.		q.		r.	S.	t.	u.	V.	w.	x.	y.	Z.	aa.
				Mech JT.Ductile Iron Pipe	Χ					X				FIC												
			2.3 A1	Mech JT Ductile Iron FTGS	Χ					X				FIC												
			2.3 A1a	Glands, Gaskets & Bolts	Χ					Х				FIC												
			2.3 B	Push on JT Ductile Iron Pipe	Χ					X				FIC												
			2.3 B1	Push on JT Ductile Ir. FTGS	Χ					X				FIC												
			2.3 B1a	Gaskets	Χ					X				FIC)											
				Grooved End Ductile Iron Pipe	Χ					Х				FIC)											
			2.3 C1	Grooved End Fittings	Χ					Х				FIC)											
					Χ					Χ				FIC												
					Χ					Χ				FIC												
				Ductile IR Deflect. FTGS	Χ					Χ				FIC												
				Ductile IR Exp. JTS	Χ					Χ				FIC												
			2.4 A	Type K Soft Copper Tube	Χ					Χ				FIC												
			2.4 A1	Copper Fittings	Χ					Χ				FIC												
			2.4 B	Hard Copper Tube	Χ					Χ				FIC												
			2.4 B1	Copper Fittings	Χ					Χ				FIC												
			2.4 C	Bronze Flanges	Χ					Χ				FIC)											
				Copper Unions	Χ					Χ				FIO												
			25.5 A	PVC SCD. 40 Pipe	Χ					Х				FIO												

2.5	A1 PVC SCD. 40 & FTG's	X	Х	F	FIO
2,5	B PVC SCD 80 Pipe	X	Х	F	FIO TO
2.5	B1 PVC SCD 80 FTGS	X	Х	F	FIO TO
2.5	B2 PVC SCD 80 Threaded FTGS	X	Х	F	TIO TO
2.5	C PVC AWWA 900	X	Х	F	TIO TO
2.5	C2 PVC Fabricated FTG's	X	Х	F	TIO TO
2.5	C3 PVC Molded Ftg's	X	Х	F	TIO TO
2.5	C4 Push on Jt. Ftgs	X	Х	F	TIO TO
2.5	C4 Push on Jt Ftgs	X	Х	F	FIO TO
2.5	C4A Gaskets, Rubber	X	Х	F	FIO TO
2.5	C5 Mech Jt. Duct Iron Fittings	X	Х	F	-IO
2.5	C6 Set Screw Glands, Bolts	X	Х	F	TIO TO
2.6	B1 Trans. Couplings (DN 40)	X	Х	F	TIO TO
2.6	.B 2 Trans. Couplings (DN50)	X	Х	F	TIO TO
2.7	A1 Nonferrous metal piping	X	Х	F	FIO
2.7	A2 Ferrous piping	X	Х	F	FIO
2.7	B1 Dielectric Unions	X	Х	F	FIO TO
2.7	B3 Dielectric Fl. Ingul. Kit	X	Х	F	FIO TO
2.7	B4 Dielectric Couplings	X	Х	F	FIO TO
2.8	gates valve	X	Х		TIO O
2.8	Seated Gate Valve	X	X		FIO CONTRACTOR CONTRAC
2.8	Seated Gate Valve		X		FIO
2.8	Seated Gate Valve	X	X		FIO
2.8	Seated Gate Valve		X		FIO
2.8	valves	X	X		FIO
2.8	Valve	X	X		FIO CONTRACTOR CONTRAC
2.8	Valve Bronz Body/Bonnet	X	X		FIO
2.9	Bronze/Solid Wedge		X		FIO
2.9	A Tapping Sleeve Assemblies	X	X	F	FIO TO

	2.9 B	Valve Boxes	Χ		Х			FIO				
	2.10 A2	Check Valves, Swing Ck	Χ		Х			FIO				
		Type										
	2.10 B2	Check Valves, Swing CK Type 175-PSIG			X			FIO				
	2.11 B3	Check Valves, Swing CM Type 250 - PSIG			X			FIO				
	2.11 B	Service Saddle Assemblies	Χ		X			FIO				
	2.11 C	Curb Valves	Χ		X			FIO				
	2.11 D	Service Boxes	Χ		X			FIO				
	2.12 B	Pressure Regulating Valve	Χ		X			FIO				
	2.13 C	Flow Regulating Vlave	Χ		X			FIO				
	2.13 B	Air Release Valve	Χ		Х			FIO				
	2.13 C	Air/Vacumn Valve	Χ		X			FIO				
	2.14 D	Comb Air Valves	Χ		X			FIO				
	2.14 B	Detector Check Valves	Χ		X			FIO				
	2.14 C	Det Chk VaLves FM App'd	Χ		X			FIO				
	2.16	Water Meter Boxes	Χ		X			FIO				
	2.17 B	Hose conn. Vacuum breaker	Χ		X			FIO				
	2.17 C	Hose Conn. Backflow Preventers	X		X			FIO				
	2.18 B2	Backflow Preventer NPS2 & smaller	Х		X			FIO				
	2.18 B3	Backflow preventer NPS 2- 1/2 & larger	Х		X			FIO				
	2.18.C	Pipe applied atmospheric type vacuum breakers	Х		X			FIO				
	2.18 D	Reduced pressure principle backflow preventers	Х		X			FIO				
	2.19 A	Concrete vault	Χ	Х	Х			FIO				
	2.19 B	Ladder	Χ	Х	Х			FIO				
	2.19 C	Manhole Fr & Cover	Χ	Х	Х			FIO				
	2.19 D	Manhole FR ^ Cover, Grade 60-40-18	X	Х	X			FIO				
							-					
			1				-					
			-	-								
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TITL	E AND I	LOCA		Lincoln Multicultural High So hington, D.C.	cho	ol &	Mi	ddle				,				CON	TRACTOF	3					SPE	CIFICATIO	N SECTION
			vv as	milgion, D.C.																			0	2530	
					TYP	E OF	SUB	MITTA	\L						CLASSI- FICATION			CONTRACTO			CONTRA ACTI			VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	I N S T R U C T I O N S	SCHEDULES	S T A T F E E M F E C N F T S S	C E R T I F I C A T E S	S	R E C O R D S	O & M A N U A L S	N F O R M A T I O	O V A E P R P	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	i. I.	m	. n.	0.		p. q.	r.	S.	t.	u.	٧.	W.	x.	y.	Z.	aa.
			2.2A	Hub & Spigot Case Iron Soil	Χ					Х				F	10										
				Pipe - gray iron																					
					Χ					Х					IO										
					Χ					Х					IO										
				Cast Iron Heavy Duty Couplings	X					X				F	TIO										
			2.3 C	Ductile Iron Sewer Pipe	Χ					Х				F	IO										
			2.3 C1	Std. Pattern, Duct Ir. Ftgs	Χ					Х				F	IO										
				Compact pattern - doct ir. Ftg.	Χ					Х				F	IO I										
				Gaskets, Rubber	Χ					X				F	IO I										
				PVC Pressure Pipe	Χ					X				F	IO I										
			2.3 D1	PVC Pressure Ftgs	Χ					Х				F	IO										
					Χ					X				F	IO I										
				PVC Sewer Pipe & Flgs NPS15						X				F	IO I										
				Gaskets	Χ					X				F	IO I										
				PVC Sewer Pipe & Flgs NPS18	Χ					X				F	IO I										
				Gaskets	Χ					Х				F	IO I										
				PVC Gravity Sewer Pipe & Ftgs						Х					10										
					Χ					Х					10										
					Χ					Х				F	10										
					Χ					Х				F	10										
					Χ					X				F	IO I										

2.4 A3	Sleeve Mt'l for Dissimilar Pipe	Χ		X		FIO			
2.4 A4	Bands, Stainless Steel	Χ		X		FIO			
2.4 B	Pressure Type Couplings	Χ		X		FIO			
2.4 C	Duct IR Flex Jts	Χ		X		FIO			
2.4 D	Duct. Ir. Deflection Ftgs.	Χ		X		FIO			
2.4 E	Duct. Ir. Exp. Jts	Χ		X		FIO			
2.5 A	Fiberglass Steps	Χ		X		FIO			
2.6 A	Precast Concrete Manholes	Χ		X		FIO			
2.6 A6	Gaskets	Χ		X		FIO			
2.6 A8	Fiberglass Steps	Χ	Х	X		FIO			
2.6 A9	Steps ASTMC478	Χ	Х	X		FIO			
2.6 A10	Pipe Connectors	Χ				FIO			
2.6 B	Hvy Traffic Precast Conc	Χ	X			FIO			
	Mts.								
2.6 B2	Gaskets	Χ				FIO			
2.6 B4	Steps, Fiberglass		Х			FIO			
2.6 B5	Steps, Steel		Χ			FIO			
2.6 B6	Pipe Connectors		X			FIO			
2.6 C	Cast In Place Mt's		Х			FIO			
2.6 C3	Steps, Fiberglass		X			FIO			
2.6 C4	Steps, Steel		Х			FIO			
2.6 D	Fiberglass Mt's		Х			FIO			
2.6 D4	Steps, Fiberglass		Х			FIO			
2.6 D5	Pipe Connectors		X			FIO			
2.6 E	MH Frames & Covers	Χ	Χ			FIO			
2.6 F1		Χ				FIO			
2.6 F2	•	Χ	X			FIO			
	Holes								
2.7 F3	MH Cover Inserts w/value	Χ				FIO			
2.9 A1	Iron Backwater Valves, Horiz	Χ		X		FIO			
2.9 A2	Manual	Х	X			FIO			
2.9 A3	Iron Backwater Valve, Term.	Χ	X	X		FIO			
2.9	PVC Backwater Valves	Χ		X		FIO			
2.10 A1	Light Duty Cleanouts	Χ		X		FIO			
2.10 A2	Med Duty Cleanouts	Χ		X		FIO			
2.10 A3	Hvy Duty Cleanouts	Χ		X		FIO			
2.10 A4		Χ		X		FIO			
2.10 A5	Sewer Pipe Ftg & Riser To CO	Χ	X	X		FIO			

							S	UBN			- RE 5-1-		STI	ER										TRACT NO DACA 31-0	O. 00-D-0039
TITI	E AND	LOC		Lincoln Multicultural High S hington, D.C.	chool o	& Mi	iddl	le Sc				-,				CONT	RACTOF	२					SPEC 025		ON SECTION
					TYPE C)F SUF	вміт	TAL	1	I	1	•	ı	CL FIC	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GOV!	ERNMENT ACTION	
ACTIVITY NO a.	TRANS-MITTAL NO.	I T E M NO. C.	SPECIFICATION PARAGRAPH NUMBER d.	DESCRIPTION OF ITEM SUBMITTED	D A N G S	RAVIONS	S C H E D U L E S	A T E M E N T S	REPORTS k.	CERT-F-CATES -	оамрішо к	RECORDS c	O & M M A N U A L S O.	N F O R M A T I O N	E V	E V I E W	SUBMIT S.	APPROVAL NEEDED BY t.	MATERIAL NEEDED BY U.	C O D E	DATE W.	SUBMIT TO GOVERN- MENT X.	C O D E	DATE z.	REMARKS aa.
			02541	Portland Cement Concrete Tennis Court Surfacing	9			, , ·						X	4.										
			022541- 51	Acid	х	х		X		X	X		X	FIO											
			022541-53	Concrete Primer	X	X				X	X			FIO											1
			022541-55	Color Filler-Finish	X	х				X	X				G	A/E									
			022541-58	Sand	X					x				FIO									+		
			022542-2	Line Paint	х	X				X	X				G	A/E									
				Shop Drawings	хх	\perp		X		X					G	A/E									
						+																	+		
						\mp																			
						\pm	t																<u> </u>		

								SU	BMIT (E			EG		ΓΕΙ	R									TRACT NO DACA 31-0	
TITL	E AND 1	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	. Mi	ddle	Schoo	ol					(CONT	RACTOR	?						CIFICATIO 2577	N SECTION
					TYI	PE OF	SUB	MITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RG%	I N S T R U C T I O N S	SCHEDULES	S T A T E E M P O N R T T S S		S A M P L E S			N F C F N F F N F F F F F F F F F F F F	O V A E P	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	СООЕ	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 02577	e. Pavement Marking	f.	g.	h.	i.	j. k.	I.	m.	. n.	0.		p. q.	r.	S.	t.	u.	V.	w.	X.	у.	Z.	aa.
			02577	Pavement Marking																					
			02577-1, line 55	Marking Paint										I	FIO										
																									<u></u>
											-			-											
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								SU	JBMI [*]			REG 1-10		TE	R										NTRACT NO DACA 31-0	
TITL	E AND	LOCA	ATION Bell/ Was	Lincoln Multicultural High Sohington, D.C.	cho	ol &	Mi	ddle					,				CONT	RACTOR	?						CIFICATIO 2584	N SECTION
					TYF	PE OF	SUB	BMITT	AL						CLASSI FICATIO	I- DN			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NG%	I N S T R U C T I O N S	8 C H H D D L H 8	S T A T F E E E N T S S	C E R T I I C A T E S S	· s	S RECOR	8 N	N N N N N N N N N N N N N N N N N N N	I N G G O V E R N N M A A T I O N E N Y T	A P P R	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 1.3	e. UNDERGROUND DUCTS	f.	g. X	h.	i.	j. k	i. I.		n. n	. О).	p. c		r. AE	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
		'		AND UTILITY STRUCTURES	^						`					ľ	\L									
																										
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 02620 CLASSI-FICATION CONTRACTOR SCHEDULE DATES GOVERNMENT ACTION TYPE OF SUBMITTAL CONTRACTOR ACTION C E R A C T Ν 0 S T G O S & M S V E R R E D С ATEMENTS R S A M P R E C O R D S Р SUBMIT SPECIFICATION A W C T R N TRANS-V **APPROVAL** MATERIAL TO E P O R T S NEEDED Т MITTAL Ε PARAGRAPH **DESCRIPTION OF** С N A U T NEEDED GOVERN-Υ NO. M NUMBER M E C O C 0 ITEM SUBMITTED 0 Ε **SUBMIT** BY DATE MENT DATE 0 BY REMARKS L E S W N G S 0 Ν N S E S E S N T 0 Е D D SNY 0 Ο. D Ε Ε b. C. d. e. g. k. m. n. Ο. p. q. r. S. u. ٧. W. Х. у. Z. aa. 02620 Subdrainage 02620-1, line Perforated Pipe FIO 02620-1, line Solid Pipe FIO 02620-1, line Pipe with open joints FIO 02620-1, line Drainage conduits FIO 02620-1, line Drainage panels FIO 02620-1, line Geotextile fabrics FIO

								SL	JBMIT (E	TAL R 41			STE	ER										ITRACT NO DACA 31-0	
TITI	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle								CONT	RACTOF	₹							ON SECTION
																								2700	
					TYF	E OF	SUB	MITT	٩L					CLA	SSI-			CONTRACTO			CONTRA		GO	/ERNMENT	
					-				-	1	1		1	FICA	TION			SCHEDULE DA	ATES	ı	ACTI	<u>ON</u>		ACTION	ļ
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	SCHEDULES	S T A T E E M P O R T T S S	CERTIFICATES	Α	RECORDS	O & M M A N U A L S	T O	G O V E R N M E N T	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	x.	y.	Z.	aa.
			2.1A 1	Cleanouts	Χ					Х				FIO											1
			2.2 A	HDPE Pipe	Х					Х				FIO											
				Reinf. Conc. Pipe	Х					Х				FIO											
				Gaskets	Х					Х				FIO											
				Sleeves for Conc. Pipe	Χ					Х				FIO											
				Sleeve for Plastic Pipe	Χ					Х				FIO											
				Stainless Steel Bands	Х					Х				FIO											
				Precast Conc. M-1's	Χ	Х				Х				FIO											
			2.5	Storm Drain Inlets	Χ	Х				Х				FIO											
			2.6	Aqua-Swirl Concent	Χ	Х		Χ		Х					G	AE									
						-				-															ļ
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								SU	BMI [*]	TTA ER 4			STE	ΞR										NTRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High	Scho	ol &	Mic	ldle	Scho	ol		-				CON	TRACTO	R					SPE	CIFICATIO	N SECTION
			was.	hington, D.C.																				2741	
					TYF	PE OF	SUB	MITTA	AL .			1	1	CL FIC	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATIO N PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	- N S T R U C F - O Z S		S T A T E E M P C N T T S S	C E R T I F I C A T E S	SA	R E C O R D S	O & M A N U A L S	N F O R M A T I O L	E V	E V I E W E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j. k		m.	n.	0.		q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
				Coarse Aggregate	X					Х				FIO											
				Fine Aggregate	Х					Х				FIO											
				Mineral Filler	Х					Х				FIO											
				Asphalt Cement	X					X				FIO											
				Prime Coat	Х					Х				FIO											
				Tack Coat	Х					Х				FIO											
			2.2 E	Undersealing Asphalt	Х					Х				FIO											
			2.3 A	Herbicide	Х					Х				FIO											
			2.3 B	Sand	Х					Х				FIO											
				Paving Geotextile	Х						Χ			FIO											
-				Joint Sealant	Х					Х				FIO											
			2.3 E	Pavement-Marking Paint	Х					Х				FIO											
				Glass Beads	Х					Х				FIO											
				Hot Mix Asphalt "BC"	Х					Х					G	AE									
			2.4 A3	Hot Mix Asphalt "SF"	Х					Χ					G	AE									
												_				1									
						-					-	_				1						1			
						1		-			-	₩				1									
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								SU	BMI7	TAI R 41			STE	R											ITRACT NC DACA 31-00	
TITL	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle								С	ONT	RACTOR	2						CIFICATION 2751	N SECTION
					TYP	E OF	SUB	MITTA	L .					CL FIC	ASSI- ATION	ı		;	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	- NSTRUCT-ONS	SCHEDULES	STATE PORTS	I C A T E	A M	R E C O R D S	A N U A	I N F O R M A T I O N	R N M	A P P R O V E D	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	p.	q.		r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
				Mixed Design	X									V	G	Α	<u> </u>							-		
				Form materials	X		V							X X										-		
			2.1 B	Form release	X		X			\ <u>\</u>																
			2.2 A	Steel welded wire fabric Reinforcement Bars	X					X				X												
					X					X				X												
				Plain Steel Wire Joint Dowel Bars	X					X				X X												
					X					X																
			2.2 E	Tie Bars	X					X				X												
-				Hook Bolts	X				-	X	1			X												
-				Bar supports	X					X	-			X		_										
-				Portland cement	X					X				X												
-				Aggregate class 4S	X				-	X	1			X												
-				Aggregate class 4M	X					X				X												
-				Aggregate class 1N	X					X				X												
				Exposed aggregate	X	-	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			Χ	<u> </u>			X		_										
				Air entraining admixture	X		X				1			X		_										
				Water reducing admixture	X		X				_			X												
				High range water reducing admixture	X		X							X												
			2.4 E	Water reducing and accelerating admixture	Х		X							X												
			2.4 F	Water reducing and retarding admixture	X		X							X												

	2.5	5 A	Absorptive cover	Χ	Χ		()	Χ		X			
	2.5	5 B	Moisture retaining cover	Χ	X		()	X		x			
	2.5			Χ	X					X			
	2.5	5E (CL solvent borne liquid		X					X			
	2.5	- r	membrane curing compound Clear waterborne membrane	Χ	Χ					X			
	2.5	C	curing compound										
		C	compound	Х	X					X			
	2.6			Х				X		X			
	2.6		5 5	Χ	X			X		X			
			• .	X	X			X		X			
	2.6			X	X		(X			
	2.6	6.E	Bonding agent	X	X					X			
	2.6	6 F	Epoxy bonding adhesive	Х	X					X			
	2.6			X	X					X			
	2.6	6 H	Colored dry-shake hardner	Х	X					X			
+										 			
						-+	\dashv	_					
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								SL	IBMIT (E			EG -10)		ΈI	R								CON	NTRACT NO DACA 31-0). 0-D-0039
TITI	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle				,				CONT	TRACTOF	₹						CIFICATIO 780	N SECTION
					TYF	PE OF	SUB	MITT	AL .		1		1		CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A & - N G %	I N S T R U C T I O N S	SCHEDULES	S T A T E E P O R T S	CERTIFICATES	s	R E C O R D S	O & M M A N U A L S	1 1 0 0 0 0 0 0 0 0	GO V E P P R O V E D R M A T I O N	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	l.	m	. n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			02780	Unit Pavers							-			Х	(
			02780-2,	Brick Pavers	x				x		Х		X		G	AE									
			,						-																
														+											
																						1			
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						1											1								

								SL	JBMIT (El			EG -10)		ER	?								CON	NTRACT NO DACA 31-0). 0-D-0039
TITI	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	Scho	ol &	Mi	ddle				,				CON	TRACTOF	₹						CIFICATION 792	N SECTION
					TYF	PE OF	SUB	MITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	G	I N S T R U C T I O N S	\circ C H \sqcup D U \sqcup \sqcup \circ	S T A T E M E N T S	CERTIFICATES	S	RECORDS	O & M A N U A L S	N F O R M A T I	O V A E F N F O M O	E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	. n.	0.	. 1	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			02792	Tennis Courts Surface		+																1			
			02792-1, line 18	Shop Drawings	X	x	x				x		x		G	A/E									
			02792-1, line 21	Samples	X	x	x				X		X		G	A/E									
			02792-1, line 39	Latex-ite Acrylic Color Sealer	X	X	X				X		X		G	A/E									
						\perp																			
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								SI	JBMIT (E			EG (-10)		ΓΕΙ	R								CON	TRACT NO DACA 31-0). 0-D-0039
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	Scho	ol &	Mi	ddle				,			1	CON	TRACTOF	?						CIFICATIO 793	N SECTION
					TYF	PE OF	SUB	BMITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y NO	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RG%	I N S T R U C T I O N S	SCHEDULES	S T A T E M E N T S	CERTIFICATES	s	R E C O R D S	& M	M I	I	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	СОDЕ	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m	. n.	0).	p. q.	r.	S.	t.	u.	V.	W.	x.	y.	Z.	aa.
				Base Ball & Soft Ball Infields																					
			02793-1, line 18	Texture Analysis	X				Х			X	X	I	FIO										
			02793-1, line 20	Sand Distribution	X				х			X	X	I	FIO										
													1												
																						1			
																						1			

								SI	JBMI [*]	TTA ER 4				ER										NTRACT NO DACA 31-0	
ΓITL	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	z Mi	ddle	Scho	ol						CON	TRACTOF	8						CIFICATIO 794	N SECTION
					TYI	PE OF	SUE	ВМІТТ	AL				1	F	CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION		VERNMENT ACTION	
ACTIVITY	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR A W I N G S	- N S T R U C T - O N S	U L E S	S T A T F E E E M F F T S S		s	RECORDS	O & M M A N U A L S	N F O R M A T I	G O V E P P R N M M E N T D	R E V E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. l.	m	. n.	0.	р	o. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			02794	Exterior Athletic Equipment																					
			•	Basket Ball Back Boards, Goals & Nets	X	x	x			х			X		G	AE									
				Base Ball & soft Ball Back Stops, Foul Poles, Bases, Home Plate & Pitchers Rubber		X	x			X			x		G	AE									
				Portable Soccer Goals	X	X	X			X			X		G	AE									
			02794-2, line 17	Player Benches	X	X	X			X			X		G	AE									
														1											
														+											
														1											

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION 02810 Washington, D.C. CLASSI-FICATION CONTRACTOR SCHEDULE DATES GOVERNMENT ACTION TYPE OF SUBMITTAL CONTRACTOR ACTION C E R A C T Ν 0 S T G O S & M S V E D R R E С A T E M E N T S S A M P L E S R E C O R D S Р SUBMIT A W SPECIFICATION C T R N TRANS-V **APPROVAL** MATERIAL TO E P O R T NEEDED Т MITTAL Ε PARAGRAPH **DESCRIPTION OF** С N A U T GOVERN-NEEDED M E N T Υ NO. NUMBER C O M ITEM SUBMITTED 0 Ε SUBMIT BY DATE MENT С 0 BY DATE REMARKS Ō N G S Ν N S E S E S 0 Е D D SNY 0 Ο. S D Ε b. C. a. m. n. Ο. p. s. u. ٧. w. Х. Z. aa. 2-1.5 A1 Water Regulators Water Hammer Arrestor **A2 A3** General Duty Valves Specialty Valves Α4 Control Valve Boxes **A5 A6** Sprinklers Irrigation Specialties **A7** A8 Controllers A9 Control Cables 2 B **Shop Drawings** 2 C Coordination Field Quality Control 2 D 2 E Irrigation System

								SL	JBMIT (EI	TAL R 41			STE	ΞR										ITRACT NO DACA 31-0	
TITL	E AND L	OCA		Lincoln Multicultural High So hington, D.C.	choc	ol &	Mic	ddle								CONT	RACTOF	₹					SPE 028		N SECTION
					TYF	PE OF	SUE	BMITT	AL					CL FIC	ASSI- ATION	-		CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	S	I N S T R U C T I O N S	SCHEDULES		CERTIFICATES		E C O R D S		N F O R M A T I O N	GOVERNOVED WENT	W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 02821	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			02821	Chain Link Fencing																					
			02821-2, line 48	Chain Link Fence Fabric	X	X				X	X	X	X		G	A/E									
			,	Industrial Fence Framing	X	X					X		X		G	A/E									
			02821-3, line 11	Industrial Swing Gate	X	X							X		G	A/E									
			02821-3, line 38	Fittings	X								X												
				Grout and anchoring Cement	X								X												
			02821-4, line 10	Fence Grounding	X								X												
			02821-4, line 26	Polymer Finishes	X								X		G	A/E									

								SL	JBMIT (E			EGI -10)		ER										ITRACT NC DACA 31-0	
ritl.	E AND L	OCA		Lincoln Multicultural High S hington, D.C.	choc	ol &	Mic	ldle	Schoo	1						CONT	RACTO	₹					SPE 028		N SECTION
					TYF	PE OF	SUE	MITT	AL	1		1		Cl FIC	ASSI- ATION			CONTRACTO	OR ATES		CONTRA ACT	ACTOR ION		/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	G	I N S T R U C T I O N S	SCHEDULES	S T A T E M E N T S	CERTIFICATES	SAM	E C O R	O & M M A N U A L S	N F O R M A T I	E V N E	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	е.	f.	g.	h.	i.	j. k.	I.	m	. n.	0	р.	q.	r.	S.	t.	u.	٧.	W.	X.	у.	Z.	aa.
			02832	Pre-Manufactured Steel Fencing																					
			02832-3, line 28	Ferrous Metal	X	x				X	X		X	FIO											
				Grout and Anchoring Cement	X	X				X	X		X	FIO											
			02832-4, line 5	Paint	X	x	X			X	X		X		G	A/E									
			02832-4, line 11	Fasteners	X	X	X			X	X		X	FIO											
			02832-4, line 19	Metal Fencing & Gates	X	x	X			X	X		X		G	A/E									
										-															

								SL	JBMIT (E	TAL R 41				ER									CON	ITRACT NO DACA 31-0). 0-D-0039
TITL	E AND L	OCA	TION Bell/I Wasl	Lincoln Multicultural High S hington, D.C.	Schoo	ol &	Mic	ddle	Schoo	l						CONT	RACTOF	?					SPE 028		N SECTION
					TYF	PE OF	SUE	BMITT	AL					CL/ FIC/	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION	GO\	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G %	- N S T R U C T - O N S	SCHEDULES	S T A T E M E N T S	CERTIFICATES	SAMPLES	RECORDS	C & N N A N U A L S	N F O R M	GOVERNOVED	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0	. р.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			02840	Traffic Signage																					
			02840-1, line 31	Signs	Х	X				X	X		X	X	G	A/E									
												+													
											1														
											-	+													
												+													

								SUE				REC -1-10		TE	R										TRACT NO DACA 31-0	O. 00-D-0039
TITL)	E AND L	OCA	ATION Bell/l Wash	Lincoln Multicultural High nington, D.C.	Schoo	1 & 1	Mid	dle S	Scho	ool							CONT	TRACTO	₹					SPE0 028		N SECTION
					TYP	E OF	SUB	MITTAI	L						CL/ FIC/	ASSI- ATION			CONTRACT	OR ATES		CONTRA ACTI	CTOR ON	GOV	ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	- N S T R U C T - O N S		S T A T E M E N T S	R	CERTIFICATES	S A M P L E S	R E C O R	M A N U A	O N L Y	E V	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i. j	j.	k.	l. ı	m. ı	n.	ο.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			02842	Bicycle Racks							+															
			02842-1, line 20	Bicycle Racks	x	x)	()	(>	(FIO											
										+																
										-																

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION 02900 Washington, D.C. CLASSI-FICATION CONTRACTOR SCHEDULE DATES TYPE OF SUBMITTAL CONTRACTOR GOVERNMENT ACTION ACTION C E R A C T Ν 0 S T G O S & S M V E D R R С R E ATEMENTS S A M P R E C O R D S Р SUBMIT A W SPECIFICATION C T E D R N TRANS-V **APPROVAL** MATERIAL TO E P O R T NEEDED Т MITTAL Ε PARAGRAPH **DESCRIPTION OF** С N A U T GOVERN-NEEDED Υ NO. M NUMBER M E C O ITEM SUBMITTED 0 Ε **SUBMIT** BY DATE MENT С 0 BY DATE REMARKS L E S W Ō N G S 0 Ν N S E S E S N T 0 Е D D 0 Ο. S SNY D Ε Ε b. C. d. e. g. h. k. m. n. 0. p. q. s. u. ٧. Х. у. Z. aa. FIO 1-3 B Plant data certification 1-3 C Seed vendor certification FIO 1-3 D1 FIO Samples - mulch Χ 1-3 D2 Samples - edging mat FIO Χ Qualification data 1-3 E FIO 1.3 F 1 & 2 Existing surface soil and FIO imported topsoil 1.3 G Plant Material FIO 1.3 H Landscape Maintenance FIO X Topsoil Analysis FIO 1.4 D FIO Landscape Plan G ΑE Plant Schedule G ΑE

								SL	JBMIT (E			EG -10)		ΓΕΙ	R									ITRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	: Mi	ddle	Schoo	ol						CON	NTRACTO)R					SPE 03 (N SECTION
					TYF	PE OF	SUE	BMITT.	AL I				1		CLASSI- FICATION			CONTRACTOR SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	/ERNMENT ACTION	<u> </u>
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RG%	I N S T R U C T I O N S	SCHEDULES	S T A T E P P O R T S S	CERTIFICATES	S	RECORDS	O & M M A N U A L S	1 F N N N N N N N N N	R	A RPP VI E W E D	SUBMI	APPROVAL NEEDED T BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	. n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			03051	Cold Weather Concrete																					
			03051-1, line 38	Slabs on Ground	X		x		X			x	x		G	AE									
			,	Elevated Slabs and Structural Members	X		X		X			Х	X		G	AE									
																									 I
														\perp											
										<u> </u>															
												t	<u> </u>												
-						-				+	1														

							SL	BMI7			REC -1-1			ER										TRACT NO. DACA 31-00	
TITL	E AND L	.OCA		ncoln Multicultural High Schogton, D.C.	ool &	ž M	iddl					,				CONT	RACTOF	?					SPE0	CIFICATION 00	SECTION
					TYPI	OF	SUBI	ЛІТТАL						CLA FICA	SSI- TION			CONTRACTO SCHEDULE DA	R TES		CONTRA ACTI			VERNMENT ACTION	
A C T I V I T Y	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T	D R A W I N G	I N S T R C F F C L L L L L L L L L L L L L L L L	A T E M E N T	R E P O R T	CERTIFICATES	A I M O P O I I E I I I I I I I	R E C O R D	M A N U A	O R M A T ON I L O Y	GOVERPROVENT	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h. i.	j.	k.	l.	m. r	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			03300	Cast-In-Place Concrete										FIO											
			,	Form Material	X X	X		++	_					FIO											
			03300-3, line 36	Portland Cement	X				()	×	X	()	X	FIO											
				Normal-Weight	x)	()	X	Х	()	X	FIO											
			03300-3,	Aggregates Air-Entraining Admixture	X)	()	x	Х	()	X	FIO											
			03300-3,	Water Reducing	x)	()	X	Х	()	X	FIO											
				Admixture High-Range Water	X)	()	X	Х	()	X	FIO											
				Reducing Admixture																					
				Water-Reducing Accelerating Admixture	X)	()	X	X	(X	FIO											
			03300-4,	Water-Reducing Retarding Admixture	x)	()	X	Х	()	X	FIO											
					X	x)	()	X	Х	()	X	FIO											
				Dovetail Anchor Slots	X	x)	X		7	X	FIO											

03300-4, line 61	Water Stops	x x			х	X	FIO								
03300-5, line 1	Rubber Water Stops	хх			х	X	FIO								
03300-5, line 10	Polyvinyl Chloride Water Stops	x x			X	X	FIO								
03300-5, line 22	Preformed Plastic Adhesive Water Stops	x x			X	X	FIO								
03300-5, line 34	Vapor Retarder	x x			X	X	FIO								
03300-5, line 38	Vapor Barrier	x x			X	X	FIO								
03300-5, line 44	Chemical Hardener	x x	x	X	X	X	FIO								
03300-5, line 56	Absorptive Cover	x	x	X	X	X	FIO								
03300-5, line 59	Moisture – Retaining Cover	х	х	Х	х	x	FIO								
03300-5, line 65	Liquid Membrane Form Curing Compound	х	х	Х	х	x	FIO								
03300-6, line 24	Water Based Acrylic Membrane Curing Compound	х	х	х	Х	X	FIO								
03300-6, line 39	Evaporation Control	x	х	Х	Х	X	FIO								
03300-6, line 51	Underlayment Compound	х	х	Х	х	X	FIO								
03300-7, line 3	Bonding Agent	x	х	Х	Х	X	FIO								
03300-7, line 35	Epoxy Adhesives	х	х	Х	х	X	FIO								
03300-7, line 55	Proportioning and Design Mixes	х	х	Х	х	X		G	A/E						
	Reinforcing Steel		Х					G	A/E						
	Shop Drawings		X					G	A/E						

									SL	JBMIT (E	TAI R 41	L R 15-1	EGI -10)	IST	ER	?										NTRACT NC DACA 31-0	
TIT	LE AN	D LO	OCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mic	ldle				•					CONT	RACTOF	?					SPE 033		N SECTION
						TYF	E OF	SUB	MITT	AL						CLAS FICAT	SSI- TON			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRAN MITTA NO.	AL	-⊢EM ZO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NG%	- Z O O C Z - O Z O	SCHEDULES	S T A T E M E P O R T S	C E R T I F I C A T E S	S	R E C O R D S	O & M M A N U A L S	N F O R M A T I		GO > ER N M E N T	R E V E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.		C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	. n.	0.		p.	q.	r.	S.	t.	u.	V.	w.	X.	у.	Z.	aa.
				03365	Post Tension Concrete																						
				03365-2, line 34	Concrete Mix	X			X	x	X	X		X			G	A/E									
				03365-2, line 39	Concrete Admixtures	X		X		X	X			X	F	Ю											
				03365-2, line 47	Concrete Curing	X		x		X	X			X	F	Ю											
				03365-3, line 15	Reinforcing Bars	X	X				X	X		X			G	A/E									
						_																					
						-					+																

								SL	JBMI [*]	TTA ER 4				ER										ITRACT NO DACA 31-0	
TITI	LE AND	LOCA		Lincoln Multicultural High Schington, D.C.	Scho	ol &	. Mi	ddle				-,				CON	TRACTOF	२					SPE 03 4		N SECTION
					TYI	PE OF	SUE	BMITT	AL		1	1		F	CLASSI- TICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S		S T A T E E E E N T S S	C E R T I F I C A T E S	S	R E C O R D S	O & M M A N U A L S	N F O R M A T I	G O V E P P R O V E D O N L Y	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. l.	m.	. n.	0.	р	. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			03450	Plant – Precast Architectural Concrete																					
			03450-2, line 54	Mold Materials	X					х			x	FI	0										
			03450-2, line 63	Reinforcing Materials	X					х			X	FI	0										
			03450-3, line 12	Concrete Materials	X					X			X	FI											
			03450-3, line 48	Steel Connection Materials	X					X			X	FI	0										
			03450-4, line 2	Grout Materials	X					x			X	FI	0										
			03450-4, line 9	Concrete Mixes	X					X			X		G	AE									
			03450-4, line 39	Mold Fabrication	X	X								FI	0										
				Shop Drawings	X	Х									G	ΑE									-

							S	UBN		TAL R 41				ER										NTRACT NO DACA 31-0	
TITI	LE AND	LOC		l/Lincoln Multicultural Higshington, D.C.	h School &	ż Mi	iddl	e Scl	_ `							CONT	RACTOR	?					SPE 036		N SECTION
					TYPE OF	F SUE	ЗМІТ	TAL	1			1	ı	CL/ FIC/	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	PARAGRAPH NUMBER	N DESCRIPTION OF ITEM SUBMITTED	D R A W I N G S S	I N S T R U C T I O N S	SCHEDUL	ΙE	REPORTS	CERTIFICATES	SAMPLES	R E C O R D S	O & M M A N U A L S	N F O R M A T I	GOVAPPROVED	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.		e.	f. g.	h.	i.	j.	k.	l.	m.	n.	О.	p.	q.	r.	S.	t.	u.	٧.	w.	X.	y.	Z.	aa.
			03600	Non Shrink Grout																					
			03600-1, line 18	Non-Shrink Epoxy Gro	out x	X			X				x	FIO											
			03600-1, line 51	Non-Shrink Cement Based Grout	х	x			X				x	FIO											
			03600-2, line 1	Coarse Aggregate	X								X	FIO											
														+											
								1						 											
														+											

								Sl	JBMI [*]			REG 1-10		TE	:R										NTRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle	Scho	ol							CONT	RACTOR	?						CIFICATIO 230	N SECTION
					TYF	PE OF	SUB	BMITT	AL						CLASS	SI- ON			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION	GO'	VERNMENT ACTION	<u> </u>
ACTIVITY	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S	I N S T R U C T I O N S		S T A T F E M F F C S S S S S S S S S S S S S S S S S		R R R R R R R R R R			M M A N U A L S	I N G G O O V R E M R A N T O M E N Y T O L N Y T	P P R P R O V I E D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 04230	e. Reinforced Unit	f.	g.	h.	i.	j. k	. 1	. n	n. n	. (0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			0.1200	Masonry		<u> </u>																				
			04230-1, line 21	Unit Masonry	X				X	X			х	(FIO											
			04230-1, line 57	Reinforcing Bars	X				X	X			X	I	FIO											
			04230-2, line 1	Concrete Work	X				х				X	Y	FIO											
			04230-2, line 18	Concrete Design Mixes	X	 			x x				X	ζ		G	AE									
						_						+		-												
						_								\perp												

								SL	JBMI [*]			REC		TE	ER										ITRACT NO DACA 31-0	
TITI	E AND I	LOCA		Lincoln Multicultural High hington, D.C.	Scho	ol &	z Mi	iddle	Scho	ol							CONT	RACTOR	?					SPE 047		N SECTION
					TY	PE OF	SUE	BMITT	AL						CLA FICA	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI			VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	- N S T R U C T - O N S	0 C T E D D L E 0	S T A T E E E M F C R T S S	C E R T I I C A T E S S		S R A E M C R E D S S	R	M A N U A	N F O R M A T O N L Y	GOVERNMENT	E V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. I.	. m	<u>ո. n</u>	. (0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			04720	Cast Stone																						
			04720-2, line 40	Cast Stone Units	x	X			х	X	x		х	(G	A/E									
			04720-2, line 64	Mortar Materials							X		Х	(G	A/E									
			04720-3, line 1	Portland Cement	x		X		х	X	X		Х	C	FIO											
			04720-3, line 4	Hydrated Lime	x				Х	X	Х		Х	(FIO											
			04720-3, line 5	Mortar Aggregate	X				х	X	X		Х	(FIO											
			04720-3, line 15	Anchors	X	X					X		Х	(G	A/E									
			04720-3, line 18	Dowels	X						X		Х	C	FIO											
				Job-Mixed Detergent Solution	X				х		X		х	(G	A/E									
				Setting Mortar	X		X		Х		X	X	х		FIO											
				Shop Drawings												G	A/E									

							SL				REC -1-10		TER											NTRACT NO DACA 31-0	
TIT	LE AND 1	LOC	CATION Bell Was	/Lincoln Multicultural High shington, D.C.	School &	& Mi	iddle	Sch	ool							CONT	RACTOR	1					SPE 048		N SECTION
					TYPE O	F SUE	BMITT.	AL					F	CLA ICA	SSI- TION		Ş	CONTRACTO	OR ATES		CONTRA ACTI			VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	PARAGRAPH NUMBER	N DESCRIPTION OF ITEM SUBMITTED	D R A W I A N G A S	U C T	SCHEDULES	E M E N T S	R E P O R T S	I C A T E S	A I M O P O L I I E I S S	R M E A A C N C N C N C N C N C N C N C N C N	O N F O R M A T I O N	0 N	GOVERPROVENT	R E > - E > E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.		e.	f. g.	h.	i.	j.	k.	l. r	m. r	n. o	o. p).	q.	r.	S.	t.	u.	V.	w.	X.	y.	Z.	aa.
			04810	Unit Masonry Assemblies																					
			04810-4, line 38	Mu-Decorative Concrete Masonry Units	e x x				X	()	(X	,		G	A/E									
			04810-4, line 51	Concrete Block	x				Х	()	(x	FI	0											
			04810-5, line 17	Integrel Water Repellen	t x	x		х	X	()	(x			G										
			04810-5, line 20	Sound Absorbing Concrete Block	x			х	X	()	(х			G	A/E									
			04810-6, line 6	Face Brick	x					X	(x	,		G	A/E									
			04810-6, line 18	Building (common) Brick	x					×	(X	FI	0											

04810-6, line 25	Portland Cement	х	X	X	X	Х	X	FIO								
04810-6, line 30	Hydrated Lime	x		X	X	x	X	FIO								
04810-6, line 32	Aggregate for Mortar	X		x	X	х	X	FIO								
04810-6, line 39	Aggregate for Grout	x		x	X	х	X	FIO								
04810-6, line 41	Color Mortar Pigments	X	x	X	X	х	X		G	AE						
04810-6, line 53	Water – Repellant Admixture	X	x	x	X	X	X	FIO								
04810-7, line 5	Uncoated Steel Reinforcing Bars	X			X	X	X	FIO								
04810-7, line 9	Epoxy Coated Reinforcing Steel	X			X	x	X	FIO								
04810-7, line 60	Joint Reinforcement, Single - Wythe	X			X	х	X	FIO								
04810-7, line 64	Joint Reinforcement, Multi - Wythe	X			X	X	X	FIO								
04810-8, line 11	Bent – Wire Tie	x			X	x	X	FIO								
04810-8, line 30	Flexible Anchors	x			X	x	X	FIO								

Masonry Veneer Anchors	X		X	X		X	FIO							
Metal Fasteners for Steel Studs	x		X	X		X	FIO							
Rigid Anchors	X		x	X		x	FIO							
Unit Type inserts in Concrete	X		x	X		x	FIO							
Dovetail Slots	X		x	X		X	FIO							
Anchor Bolts	x		x	X		x	FIO							
Metal Flashing	x		x	X		x	FIO							
Asphalt Coated Copper Flashing	x		x	X		x	FIO							
Rubberized Asphalt Flashing	x		x	X		x	FIO							
EPDM Flashing	x		x	X		x	FIO							
Compressible Filler	X	х	x	X		X	FIO							
Preformed Control Joint Gaskets	X	X	x	X		X	FIO							
	Metal Fasteners for Steel Studs Rigid Anchors Unit Type inserts in Concrete Dovetail Slots Anchor Bolts Metal Flashing Asphalt Coated Copper Flashing Rubberized Asphalt Flashing EPDM Flashing Compressible Filler Preformed Control Joint	Metal Fasteners for Steel Studs Rigid Anchors x Unit Type inserts in Concrete Dovetail Slots x Anchor Bolts x Metal Flashing x Asphalt Coated Copper Flashing Rubberized Asphalt x Flashing x EPDM Flashing x Compressible Filler x Preformed Control Joint x	Metal Fasteners for Steel Studs Rigid Anchors	Anchors Metal Fasteners for Steel Studs Rigid Anchors	Anchors Metal Fasteners for Steel Studs Rigid Anchors	Metal Fasteners for Steel Studs Rigid Anchors	Metal Fasteners for Steel Studs Rigid Anchors	Anchors Metal Fasteners for Steel Studs Rigid Anchors	Metal Fasteners for Steel Studs Rigid Anchors	Metal Fasteners for x Steel Studs Rigid Anchors x x x x x FIO Unit Type inserts in x x x x x FIO Dovetail Slots x x x x x FIO Anchor Bolts x x x x x FIO Metal Flashing x x x x x FIO Asphalt Coated Copper x Flashing Rubberized Asphalt x Flashing x x x x x FIO EPDM Flashing x x x x x FIO Compressible Filler x x x x x FIO Preformed Control Joint x x x x x x FIO Preformed Control Joint x x x x x x FIO	Metal Fasteners for x x x x x x FIO Rigid Anchors x x x x x x FIO Unit Type inserts in x x x x x FIO Dovetail Slots x x x x x FIO Anchor Bolts x x x x x FIO Metal Flashing x x x x x FIO Asphalt Coated Copper x Flashing Rubberized Asphalt Flashing x x x x x FIO Compressible Filler x x x x x x FIO Preformed Control Joint x x x x x x FIO Preformed Control Joint x x x x x x FIO Preformed Control Joint x x x x x x FIO Preformed Control Joint x x x x x x FIO	Metal Fasteners for x x x x x FIO	Anchors Metal Fasteners for X Steel Studs Rigid Anchors X X X X FIO Unit Type inserts in X X X X FIO Dovetail Slots X X X X FIO Anchor Bolts X X X X FIO Metal Flashing X X X X FIO Asphalt Coated Copper X Flashing Rubberized Asphalt X X X X FIO EPDM Flashing X X X X FIO Compressible Filler X X X X X FIO Preformed Control Joint X X X X X FIO Preformed Control Joint X X X X X FIO Preformed Control Joint X X X X X FIO	Anchors Metal Fasteners for X

04810-11, line 4	Bond Breaker Strips	x	х		х	Х		X	FIG	0										
04810-11, line 7	Cavity Drainage Material	x	X		X	X		X	FIG	0										
04810-11, line 36	Cavity Wall Insulation	x	X		X	X		X	FIG	0										
04810-11, line 55	Masonry Cleaners	x	X		Х	X		X		(G A	AE								
04810-12, line 6	Mortar for Unit Masonry	X	X		Х	X		X	FIG	0										
04810-12, line 15	Color – Aggregate Mortar	X	X		Х	X		X		(G A	AE								
04810-12, line 20	Pigmented Mortar	x	X		Х	X		X		(G A	AE								
04810-12, line 25	Water – Repellent Admixture	X	X		Х	X		X	FIG	0										
04810-12, line 28	Grout for Unit Masonry	x	X		X	X		X	FIG	0										
			+ +																	
									+											
									-											
									+											
	04810-11, line 7 04810-11, line 36 04810-11, line 55 04810-12, line 6 04810-12, line 20 04810-12, line 20	04810-11, Ine 7 04810-11, Cavity Wall Insulation 04810-11, Ine 36 04810-11, Ine 55 04810-12, Ine 6 04810-12, Color – Aggregate Mortar 04810-12, Pigmented Mortar 04810-12, Vater – Repellent Admixture 04810-12, Grout for Unit Masonry	line 4 04810-11, Cavity Drainage Material x 04810-11, Cavity Wall Insulation x 104810-11, Masonry Cleaners x 104810-12, Mortar for Unit Masonry x 104810-12, Color – Aggregate x 104810-12, Pigmented Mortar x 104810-12, Water – Repellent x 104810-12, Water – Repellent x 104810-12, Grout for Unit Masonry x	line 4 04810-11, Cavity Drainage Material x x line 7 04810-11, Cavity Wall Insulation x x line 36 04810-11, Masonry Cleaners x x x line 55 04810-12, Mortar for Unit Masonry x x line 15 04810-12, Color – Aggregate x x x line 15 04810-12, Pigmented Mortar x x line 20 04810-12, Water – Repellent x x x line 25 04810-12, Grout for Unit Masonry x x	line 4 04810-11, Cavity Drainage Material x x 04810-11, Cavity Wall Insulation x x 104810-11, Ine 36 04810-11, Ine 55 04810-12, Ine 6 04810-12, Color – Aggregate x x Ine 15 04810-12, Pigmented Mortar x x 04810-12, Ine 20 04810-12, Water – Repellent x 104810-12, Ine 25 04810-12, Grout for Unit Masonry x 104810-12, Grout for Unit Masonry x 1	line 4 04810-11, Cavity Drainage Material x x x x x x x x x x x x x x x x x x x	line 4 04810-11, Cavity Drainage Material x x x x x x x x x x x x x x x x x x x	line 4 04810-11, Cavity Drainage Material x x x x x x x x x x x x x x x x x x x	Iline 4	line 4 04810-11, Cavity Drainage Material x x x x x x Floring 7 04810-11, Cavity Wall Insulation x x x x x x x Floring 36 04810-11, Insulation x x x x x x x x x x x x x x x x x x x	line 4 04810-11, Cavity Drainage Material x x x x x x x FIO 04810-11, Cavity Wall Insulation x x x x x x x FIO 04810-11, Ine 36 04810-12, Mortar for Unit Masonry x x x x x x x x FIO 04810-12, Color – Aggregate x x x x x x x x x x x x x x x x x x x	Iline 4	1							

							SI	UBN		ΓAL R 41			STE	ER										NTRACT NO DACA 31-0	
TIT	LE AND	LOC	ATION Bell Wa	l/Lincoln Multicultural High shington, D.C.	School &	& Mi	ddle	e Scl	hool							CONT	RACTOR	2					SPE 048		N SECTION
					TYPE O	F SUE	ВМІТТ	ΓAL						CL/ FIC/	ASSI- ATION		,	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI		GO	VERNMENT ACTION	
A C T I V I T Y	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D R A W I N G S	C T I	SCHEDULES	STATEMEZTS	R E P O R T S	CERTIFICATES	SAMPLES	R E C O R D の	A N	I N F O R M A T I O N L Y	G O V A P P N R O V N T D	E V I E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.		e.	f. g.	h.	i.	j.	k.	I.	m.	n.	ο.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			04815	Glass Unit Masonry Assemblies																					
			04815-2, line 52	Hollow Glass Block	x	X				X	X	X	X	FIO											
			04815-3, line 5	Portland Cement	x	X				X	X	X	X	FIO											
			04815-3, line 18	Mortar Pigments	x	X				X	X	X	X		G	AE									
			04815-3, line 27	Panel Reinforcement	x					X	X	X	X	FIO											
			04815-3, line 37	Panel Anchors	x					X	X	X	X	FIO											
			04815-3, line 40	Asphalt Emulsion	x					X	X	X	X	FIO											

04815-3, line 44	Mineral – Fiber Expansion Strips	X		X	X	X	x	FIO				
04815-3, line 49	Plastic – Foam Expansion Strips	X		X	x	X	X	FIO				
04815-3, line 54	Dovetail Wire Ties	x		X	x	x	X	FIO				
04815-3, line 58	Anchor Bolts	x		X	x	X	X	FIO				
04815- 3, line 62	Expansion Anchors	x		X	x	X	X	FIO				
04815-4, line 6	Steel Column Anchors	x		X	X	X	X	FIO				
										1		
										1		
										-		
										1		
			-							1		
										+		
										+		
										1		

								Sl	JBM			. RE 5-1-		STE	ĒR									NTRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High Shington, D.C.	cho	ol &	Mic	ldle					,			CONT	TRACTOF	?						CIFICATIO 120	N SECTION
					TYF	PE OF	SUB	MITT	AL						CLASSI- FICATION	-		CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION		VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NG%	- N S T R U C T - O Z S	SCHEDULES	STATEMENTS		CERT-F-CATES	SAMPLES	R E C O R D S	N U A	I	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	0.	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			05120	Structural Steel		+-																	+	-	
				Structural Steel Shapes, Plates & Bars	x	X		X	X	x	X		X	X	G	A/E									
			,	Cold-Formed Steel Tubing	X	X		X	x	X	X		X	X	G	A/E									
			05120-2, line 49	Steel Pipe	X	X		X	X Z	X I	X		X	X	G	A/E									
			05120-2, line 53	Steel Casting	X	X		X	x 2	X Z	X		X	X	G	A/E									
			05120-2, line 55	Headed Stud-Type Shear Connectors	X	X		X	x 2	X :	X		X	X	G	A/E									
			05120-2, line 58	Anchor Bolts	X	X		X	X	X .	X		X	X	G	A/E									
			05120-2,	Unfinished Threaded	X	X		X	X 2	X :	X		X	X	G	A/E									<u>. </u>

line 60	Fasteners														
05120-3, line 1	High-Strength Threaded Fasteners	X	X	x	X	X	X	X	X	G	Α/	Ξ			
05120-3, line 18	Direct Tension Indicators	X	x	х	X	X	X	X	x	G	A/				
05120-3, line 22	Electrodes for Welding	X	x	x	X	X	X	X	X	G	A/	=			
05120- 3, line 24	Structural Steel Primer Paint	x	x	x	X	X	X	X	X	G	A/	E			
05120-3, line 26	Non Shrink Grout	X	X	x	X	X	X	X	X	G	A/	I			
	Shop Drawings	X	x	x	x	X	x	Х	x	G	A/	=			
	Shop Brawnige									1 "	7.4	-			
					l	1	L	Ĺ							
			1												
			+												
			+ +		+	-	-	-	-						
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			+ +		+	+	1						1		

								SI	JBMI ⁻ (E			REG 1-10)		TEI	R									NTRACT NO DACA 31-0	
TITL	E AND 1	LOCA		Lincoln Multicultural High S hington, D.C.	Scho	ol &	z Mi	ddle				•				CON	TRACTOF	?					SPE 05 2		N SECTION
					TYI	PE OF	SUE	ВМІТТ	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR A W I N G S	- X S T R U C F - O Z S	U L E S	S T A T E M E N T S		S A M P L E S		8 N A A N L A L S	N A N A A N A A N A A N A A N A A A A A	F O V A E P R P N R O M V O L N E D V T D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 05210	e. Steel Joists and Joist	f.	g.	h.	i.	j. k	. I.	m	ı. n.	. 0).	p. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
				Girders																					
			05210-3, line 39	Steel Joists & Girders	x	x			x	X			X	I	FIO										
			05210-3, line 40	Unfinished Threaded Fasteners	X	X			X	X			X	ı	FIO										
			05210-3, line 42	Carbon Steel Washers	X	X			X	X			X	I	FIO										
			05210-3, line 44	Steel Prime Paint	X	X			х	X			X	I	FIO										
				Shop Drawings	X										G	A/E									

								SL	JBMI ⁻	TTA ER 4				ER	?									NTRACT NO DACA 31-0	
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle								CON	TRACTO	R						CIFICATIO 310	N SECTION
					TYF	PE OF	SUB	BMITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	I N S T R U C T I O N S	SCHEDULES	S T A T E M P O R T T S S	CERTIFICATES	s	R E C O R D S	O & M A N U A L S	N F O R M A T I	O V /	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. l.	m.	. n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			05310	Steel Roof Deck		+																			
			05310-1, line 59	Metal Roof Deck	X	x			x	X			X		G	A/E									
			05310-2, line 1	Acoustical Metal Roof Deck Units	x	X			х	X			X		G	A/E									
				Shop Drawings	X	+						+			G	A/E	•								
				Shop Drawings	^	+										AVL	1								
					1							1	_	-											
						+						-	+	-											
					+	+							+												
						<u> </u>																			
					+	+						+	+	-											
						+																			

								SL	JBMIT (E	ΓΤΑ ER 4				EF	₹									NTRACT NO DACA 31-0	
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	. Mi	ddle								CONT	TRACTO	R						CIFICATIO 320	N SECTION
					TYF	PE OF	SUB	BMITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - Z G Ø	I N S T R U C T I O N S	SCHEDULES	S T A T E M P O R T T S S	CERTIFICATES	s	R E C O R D S	O & M A N U A L S	N F C R N A T	F O V A R E F	E V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	. l.	m.	. n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			05320	Steel Floor Decking																					
			05320-1, line 59	Composite Metal Floor Deck Units	X	X			х	X			X		G	A/E									
			05320-2, line 3	Metal Corrugated Deck Units	X	X			х	X			X		G	A/E									
				Chan Drawings	\										G	A/E									
				Shop Drawings	X										G	A/E									
												1													
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								SU	BMIT (E	TAL R 41			STE	ER										NTRACT NO DACA 31-00	
TITI	E AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle				,				CONT	RACTOF	₹					SPE 05 4		N SECTION
					TYF	PE OF	SUB	MITTA	AL I			<u> </u>		C FIC	LASSI- CATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAS-ZGS	I N S T R U C T I O N S	SCHEDULES	S T A T E M E P O R T S	I C A T E	S A M P L E S	RECORDS	O & M M A N U A L S	M A T C	1 E V	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 05400	e. Cold Formed Metal	f.	g.	h.	i.	j. k.	l.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			05400	Framing																					
			05400-2, line 49	Steel Sheet	X	X				X			X	FIC)										
			05400-3, line 7	Steel Shapes and Clips	X	X				X			X	FIC											
				Expansion Anchors	X	X				X			X	FIC)										
			05400-3,	Power-Actuated Anchors	X	X				X			X	FIC											
				Mechanical Fasteners	X	Х				X			X	FIC											
				Welding Electrodes	X	Х				X			X	FIC)										
			05400-3, line 26	Galvanizing Paint Repair	x	х				Х			X	FIC											
			05400-3,	Non-Metallic Non Shrink Grout	X	X				X			X	FIC)										
				Shop Drawings	х										G	AE									

								Sl	JBMI [*]			REG 1-10)		ER										NTRACT NC DACA 31-0	
TITI	LE AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	iddle			.10-	1-10)				CON	TRACTO	R						CIFICATIO	N SECTION
					TYF	PE OF	SUE	BMITT	AL					F	CLASSI-			CONTRACTO	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-ZG0	I N S T R U C T I O N S	SCHEDULES	S T A T E E E M E F C S S S S S S S S S S S S S S S S S S	C E R T I I F C A T E S	S	RECORDS	O & M M A N U A L S	O R M A T	GOVAPR PRN RONLY	E V I E W E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 05500	e. Metal Fabrications	f.	g.	h.	i.	j. k	. l.	m	ı. n.	0.	p	. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			03300	ivietai Fabrications																					
			05500-4, line 47	Steel Ladders	X	X				Х			X		G	A/E									
			05500-5, line 13	Ladder Safety Cases	X	X				x			X		G	A/E									
			05500-5, line 36	Steel Ships Ladder	X	X				X			X		G	A/E									
			05500-5, line 57	Alternating Tread Stairs	X	X				x			X		G	A/E									
			05500-6, line 3	Loose Bearing and Leveling Plates	X	X				x			X	FI	0										
			05500-6, line 11	Loose Steel Lintels	X	X				X			X	FI	0										

	05500-6, line 24	Shelf Angles	X	X	Х			X	FIO						
	05500-6, line 38	Angle Extension for Wire Masonry Anchors		X	×	2		X	x						
	05500-6, line 49	Misc. Framing and Supports	x	x	×	(X		G	A/E				
	05500-7, line 7	Misc. Steel Trim	X	x	Х	(X	FIO						
	05500- 7, line 23	Structural Steel Door Frames	x	x	×	ζ		X		G	A/E				
	05500-7, line 56	Cast Nosings, Treads and Thresholds	х	x	×	ζ		x		G	A/E				
	05500-8, line 16	Pipe Bollards								G	A/E				
				+											
				+ + +			-	-							
				+ + +				+							
				+ + +				1							
1 1															

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TITI	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle								CON	TRACTO	R					SPE 05		N SECTION
					TYF	PE OF	SUB	MITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RG%	I N S T R U C T I O N S	\emptyset \square \square \square \square \square \square \square \square \square	S T A T E M E P O R T S	C E R T I F I C A T E S	S A M P L	RECORDS	O & M M A N U A L S	N F O R M A T I	O V A E P R P N R	V I E W	SUBMIT	APPROVAL NEEDED T BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			05521	Pipe and Tube Railings																					
			05521-3, line 5	Metals	X	X		X	х	X	X		X	F	10										
			05521-3, line 40	Brackets	X	X				X	X		X	F	TIO										
			05521-3, line 51	Welding Electrodes and Filler Material	X			X	х	X	X		X	F	TIO										
			05521-3, line 54	Fasteners	X	X				X	X		X	F	10										
				Cast-in-Place/Post Installed Anchors	X	x				X	X		X	F	FIO										
			05521-4, line 13	Non Shrink, Non Metallic Grout	X	x	X			X			X	F	TO										
				Shop Drawings											G	A/E	<u> </u>								

								Sl	JBMI7 (E	TAI				ER	?										NTRACT NO DACA 31-0	
TITI	LE AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle								(CONT	RACTOF	₹					SPE 05 3		N SECTION
					TYF	PE OF	SUE	BMITT	AL				1		CLASS FICATIO	SI- ON			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S	I N S T R U C T I O N S	0 U U U U U U U U	S T A T E M E P O R T S	CERTIFICATES	Α	RECORDS	O & M M A N U A L S	N F O R M A T I	V E R N	A P P R	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 05530	e. Grating	f.	g.	h.	i.	j. k.	l.	m.	n.	0.		p. (q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			03330	Grating																						
			05530-2, line 21	Metal Bar Gratings	x	X				x	X		X	F	Ю											
			05530-2, line 42	Shop Primer for Ferrous Metal	X		X			X			X	F	IO											
			05530-2, line 47	Galvanizing Repair Paint	X		x			X			X	F	Ю											
			05530-2, line 51	Fasteners	X	X							X	F	10											
				Shop Drawings	X	X										G	ΑE									
											1															

								SL	JBMIT			EG -10)		EF	R									NTRACT NO DACA 31-0	
TITL	E AND	LOCA	ATION Bell/Was	Lincoln Multicultural High Sohington, D.C.	cho	ol &	Mi	ddle			<u> </u>	,			(CONT	RACTOR	₹					SPE 05		N SECTION
					TYP	E OF	SUB	MITT	AL .	1	1	1	1		CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	SCHEDULES	S T A T E E P O R T T S S	CERTIFICATES	S	R E C O R D S	O & M M A N U A L S	N F O R M A T	F O V A R P R P	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m	. n.	0.		p. q.	r.	S.	t.	u.	٧.	W.	X.	у.	Z.	aa.
			05580	Formed Metal Fabrications																					
			05580-2, line 14	Sheet Metal		x					X		X	F	FIO										
			05580-2, line 32	Sound Deadening Insulation	X					X	X		X	F	FIO										
			05580-2, line 35	Insulation Adhesive	X					X	X		X	F	FIO										
			05580-2, line 37	Neoprene Gaskets	X					X	X		X	F	FIO										
			05580-2, line 40	Joint Sealants	X					X	X		X	F	FIO										
			05580-2, line 43	Filler Metal & Electrodes	X					X	X		X	F	FIO										

														I	T
	05580-2, line 47	Fasteners	X			x	X	X	FIO)					
	05580-2, line 54	Non-Structural Anchors	x			X	X	X	FIO)					
	05580-2, line 66	Shop Primers	X	x		X	X	x	FIO)					
	05580-3, line 1	Galvanized Repair Paint	X	x		X	X	x	FIO)					
	05580-3, line 4	Bituminous Paint	X	Х		X	X	X	FIO)					
		Shop Drawings	x x							G	A/E				
					+ +										
		+	+ +		+ +										
1															

								SI	JBM	IITT (ER				STE	ΞR											NTRACT NO DACA 31-0	
TITL	E AND I	LOC		Lincoln Multicultural High	Scho	ol &	z Mi	ddle		•			10)				CC	ONT	RACTOR	2					SPE 05 8		N SECTION
					TY	PE OI	SUE	BMITT	AL						CL FIC	ASSI- ATION				CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT			VERNMENT ACTION	
A C T - V - T Y NO	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G S	- N S T R U C T - O N S	SCHEDULES		R E P O R T S		SAMPLES	RECORDS			E F R F M C E \ N E T E	P R O V V	R E > - E > E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 05811	e. Pre-Manufactured Expansion Joint Systems	f.	g.	h.	i.	ј.	k.	l.	m.	n.	0.	p.	q.		r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			05811-3, line 34	Floor to Floor	X	X			X 2	X)	K 2	X		X	FIO												
			05811-3, line 38	Floor to Wall	x	X			X 2	x >	K 2	X		X	FIO												
			05811-3, line 42	Wall to Wall	x	X			X 2	x >	K 2	X		X	FIO												
			line 46	Wall to Ceiling	X	X			X	x >	X	X			FIO												
			05811-3, line 49	Ceiling to Ceiling	Х	X			X	X)	(X		X	FIO												
			05811-3, line 53	Wall to Soffit	х	X			X	X)	X	X		X	FIO												
			05811-3, line 57	Soffit to Soffit	х	X			X	x >	K	X		X	FIO												

								SL	JBMI7 (E			EG (-10)		ΈΙ	R									NTRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mic	ddle				,				CONT	TRACTOR	R						CIFICATIO 100	N SECTION
					TYF	PE OF	SUB	MITTA	AL I						CLASSI- FICATION		;	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION		VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A S - Z G s	- Z O - + O C A + Ø Z O		S T A T E P P O R T S S		s	R E C O R D S	O & M M A N U A L S	1 1 1 1 1 1 1 1 1 1	I	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m	. n.	0.	•	p. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			06100	Rough Carpentry																					
			06100-2, line 27	Lumber	x				х	x			x	I	FIO										
				Wood Structural Panels (Plywood)	X				X	X			X		FIO										
			1	Wood-Preservative Treated Materials	X				X	X			X		FIO										
				Fire-Retardant Treated Materials	X				X	X			X		FIO										
			06100-3, line 64	Plywood Wall Sheathing	X				X	X			X		FIO										
				Plywood Roof Sheathing	X				X	X			X		FIO										
			06100-4,	Plywood Screen	X				Х	X			x		FIO										

line 7	Sheathing										
06100-4,	Plywood Ceiling	x	X	X	X		FIO				
line 12	Sheathing										
06100-4,	Plywood Backing	X	X	~	v	,	FIO				
line 35	Panels		^	^	^	١					
1	T direit										
06100-4,	Fiberboard Sheet	х	X	Х	Х		FIO				
line 42	Flooring										
224224											
06100-4, line 48	Fasteners	x	X	X	X		FIO				
lille 40											
06100-5,	Sheathing Tape	х	X	Х	х		FIO				
line 11	3 1										
06100-5,	Sill – Sealer Gasket	x	X	X	X		FIO				
line 14											
06100-5,	Adhesives	x	X	v			FIO				
line 18	Adilesives	^	^	^	^						
06100-5,	Water - Repellent	x	X	X	х		FIO				
line 21	Preservation										
						\dashv					
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								Sl	JBMI (TTA ER 4				TE	R										ITRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High Solington, D.C.	cho	ol &	. Mi	ddle					,			(CONT	RACTOR	₹					SPE 06 4		N SECTION
					TYF	PE OF	SUE	BMITT	AL						CLASSI FICATIO				CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI			VERNMENT ACTION	
ACT->-FY ZO	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	DATA	D R A W - N G S	I N S T R U C T - O N S	S C H E D U L E S	E H H H H H H H H H H H H H H H H H H H	C E R T I I C A T T E S S	S		R	M A N U A L S	I N G O V E R N M A T I O N T T	A P P R O V E D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 06402	e. Interior Architectural	f.	g.	h.	i.	j. k	ι. l.	n	n. n	1. (0.	p. c	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
				Woodwork																						
				Medium Density Fiber Board	X	X				X	X		X	(
			06402-3, line 26	Softwood Plywood	X	x				x	X		X	(
			06402-3, line 27	Hardwood Plywood and Face Veneers	X	x				х	X		X	((G	A/E									
				Clear Tempered Float Glass for Doors	X	X				X	X		X	(
				Clear Tempered Float Glass for Shelves	X	X				X	X		X	(
			06402-3, line 37	High Pressure Decorative Laminate	X	X				X	X		X	((G	A/E									

06402-4, line 4	Fire – Retardant Particle Board	х		X	(X	7	X						
06402-4, line 27	Cabinet Hardware	хх		X	(х	2	X						
06402-4, line 54	Hanging Rods	x x		X	[X	2	X						
06402-4, line 57	Brackets & Standards	x x		X	(х	2	X						
06402-4, line 60	Map Racks	x x		X	(х	2	X	G	A/E				
06402-4, line 63		хх		X	ζ.	X	2	X						
06402-4, line 65	Coat Hooks	х		×	ζ	X		x						
06402-5, line 1	Shelf Brackets	x x		x	(X	2	X						
06402-5, line 47	Interior Standing & Running trim for transparent finish	хх		X	[x	2	X	G	A/E				
06402-5, line 64	Wood Shelving for transparent finish	х		x		Х	2	X	G	A/E				
06402-6, line 6	Plastic Laminate Cabinets	хх		х	(Х	2	X	G	A/E				
06402-6, line 33	Plastic – Laminate Counter Tops & window Stools	хх		x	(X	2	X	G	A/E				
06402-6, line 50	Shop Finishing	X	x	X	(X		X	G	A/E				

								SL	JBMI7 (E			EG (-10)		TE	R									NTRACT NO DACA 31-0	
TITI	E AND	LOCA		Lincoln Multicultural High Shington, D.C.	cho	ol &	Mi	ddle	•			,	<u> </u>			CON	TRACTO	₹					SPE 071		N SECTION
					TYF	PE OF	SUE	BMITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	I N S T R U C T I O N S	% C H E D U L E %	S T A T E P P O R T S S	C	S A M P L	E C	N	V P P	I N G F O A A E P A A N R T O M C O L N E V O L N T D	V I E W E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m	. n.	. c).	p. q.	r.	S.	t.	u.	V.	W.	x.	y.	Z.	aa.
			07131	Self Adhering Sheet Waterproofing																					
			07131-2, line 49	Rubberized Asphalt Sheet Waterproofing	X	x			X	X	X		X		FIO										
			07131-3, line 14	HDPE Sheet Waterproofing	X	X			х	X	X		X		FIO										
			07131-3, line 21	Molded Sheet Drainage Panels	X	X			X	X	X		X		FIO										
			07131-3, line 54	Primer	X	X			X	X	X		X		FIO										
			07131-3, line 56	Surface Conditioner	X	X			X	X	X		X		FIO										
			07131-3, line 59	Sheet Strips	X	X			X	X	X		X		FIO										

	07131-3, line 62	Liquid Membrane	X	X	X	X	X	X	FIO					
	07131-3, line 64	Substrate Patching Membrane	X	x	x	X	x	X	FIO					
	07131-3, line 66	Mastic, adhesives and Tape	X	x	x	X	X	X	FIO					
	07131-4, line 2	Metal Termination Bars	X	x	x	x	x	X	FIO					
	07131-4, line 5	Protection Course	X	x	х	x	x	X	FIO					
			1					1			†			
			1											
												_		
			_								 			
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION 07160 Washington, D.C. CLASSI-FICATION CONTRACTOR SCHEDULE DATES GOVERNMENT ACTION TYPE OF SUBMITTAL CONTRACTOR ACTION C E R A C T Ν 0 S T G O S & S M V E С R E D R A W ATEMENTS S A M P L E S R E C O R D S Р SUBMIT SPECIFICATION TRANS-E P O R T S R N M E N T V **APPROVAL** MATERIAL TO NEEDED GOVERN-MITTAL Ε PARAGRAPH **DESCRIPTION OF** C A T E S NEEDED Υ NO. Μ NUMBER E W C O C 0 ITEM SUBMITTED U 0 0 **SUBMIT** BY DATE MENT DATE BY REMARKS O N S N G S Ν E S E D E R D 0 D SNY 0 Ο. Ε Ε b. C. g. m. n. 0. ٧. a. p. q. s. u. W. Х. Z. aa. 07160 Bituminous Dampproofing Cold-Applied, Asphalt 07160-1, x FIO **Emulsion Dampproofing** line 60 Primer FIO 07160-2, line 12 FIO 07160-2, **Glass Fabric** line 14

								SU	BMIT (E		L RI		STI	ER										ITRACT NC DACA 31-0	
TITI	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle S				,				CONT	RACTOF	?					SPE 072		N SECTION
					TYF	PE OF	SUB	MITTAI	-					F	CLASSI-			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON		VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	- Z O - + O C Z - O Z O	S C H E I I I I I I I I I I I I I I I I I I	S T A T E P O R T S	CERTIFICATES	Α	R E C O R D S	O & M M A N U A L S	N F O R M A T I	G O V A E P N R O N E V T D	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i. j	j. k.	I.	m.	n.	0.	p	. q.	r.	S.	t.	u.	٧.	W.	x.	y.	Z.	aa.
			07210	Building Insulation																					
			07210-2, line 41	Extruded-Polystrene Board Insulation	x				X	X			X	FI	0										
				Unfaced Slag- Wool/Rock Wool Fiber Board Insulation	X				x	X			X	FI	0										
			07210-2, line 49	Glass Fiber insulation	X				X	X			X	FI	0										
			07210- 2,line 54	Unfaced Mineral-Fiber Blanket Insulation	X				X	X			X	FI	0										
			07210-2, line 61	Perimeter Fire Containment System	X				X	X			X	FI	0										
				Adhesive	X				X	X			X	FI	0										
				Protection Board	X				X	X			X	FI	0										
			07210-3, line 13	Insulation Fasteners	X				X	X			X	FI	0										

								SI	JBMI7 (E			REG		ΤE	R										ITRACT NO DACA 31-00	
TITL	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle	•			,	,			СО	NTF	RACTOR	2					SPE 07 4		N SECTION
					TYF	PE OF	SUE	BMITT	AL						CLASSI- FICATION			5	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR A W - N G S	I N S T R U C T I O N S	SCHEDULES	S T A T E M E P O R T S	CERTIFICATES	S	R E C O R D S	N	N N N N N N N N N N N N N N N N N N N	R E M R A N T O M E O L N	A FP EP \\ R I O EV V V E E ED F	/ 	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 07411	e. Manufactured Roof	f.	g.	h.	i.	j. k.	I.	m	ı. n.	. c).	p. q.	r		S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			0/411	Panels																						
				Metal-Coated Steel Sheet Prepainted with Coil Coating	X	X			х	X	x		X		FIO											
				Standing Seam Roof Panels	X	X			х	X	X		X		FIO											
			07411-3, line 58	Clips	X	x			х	x	X		X		FIO											
				Polyisocyanurate Board Insulation	X	X			х	X	X		X		FIO											
			07411-4, line 11	Thermal Spaces	X	X			x	X	X		X		FIO											
			07411-4, line 14	Fasteners	X	X			x	X	X		X		FIO											

07411-4, line 19	Accessories	x	x		X	X	X		X		FIO					
line 19 07411-4, line 23	Closure Strips	х	x		X	X	X		X	I	FIO					
07411-4, line 32	Bituminous Coating	X	X		X	X	X		X		FIO					
	Shop Drawings	Х	X								G	A/E				
				+ +												
					_			+								
				+ +					-	-						
				+				1		+						
				+ +												
				1												
				\bot						\perp						
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								SL	JBMI ^T			EG -10)		ER											NTRACT NC DACA 31-0	
TITI	LE AND	LOC		Lincoln Multicultural High Schington, D.C.	Scho	ol &	Mi	ddle				,				CO	NTRA	CTOF	₹						CIFICATION 412	N SECTION
					TYI	PE OF	SUB	BMITT	AL					ı	CLASSI- FICATION				CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RG%	I N S T R U C T I O N S	SCHEDDLES	S T A T E P P O R T S S	CERTIFICATES	SAM	R E C O R D S	A	N F O R M A T I	E I R I N I O M C N E N I L N I	A RP EP VR IIO EV WE E E R	SU	JBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	. I.	m	. n.	0.	F	o. q.	r.		S.	t.	u.	V.	W.	x.	y.	Z.	aa.
			07412	Manufactured Wall Panels																						
			line 18	Metallic-Coated Steel sheet Prepainted with Coil Coating	X	X			x	X	X		X	F	10											
			07412-3, line 43	Exterior Wall Panels	X	X			x	X	X		X	F	Ю											
			07412-3,	Gypsum Board: Gypsum Sheathing	X	Х			х	X	X		X	F	10											
			07412-3, line 57	Fasteners	X	Х			х	X	X		X	F	Ю											
				Accessories	X	X			х	X	X		X	F	Ю											
				Closure Strips	X	X			х	X	X		X	F	10											
			07412-4, line 1	Joint Sealer	X	Х			х	X	X		X	F	10											
			07412-4, line 4	Bituminous Coating	X	X			х	X	X		X	F	10											
				Shop Drawings	X	X									G	A	E									

								SL	JBMIT (E	TAI				TE	R									NTRACT NC DACA 31-0	
TIT	LE AND	LOC		Lincoln Multicultural High hington, D.C.	Scho	ol &	Mi	ddle				,	<u> </u>			CONT	RACTOF	₹					SPE 07 5		N SECTION
					TYI	PE OF	SUE	BMITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS MITTAL NO.	T	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	8 C H E D U L E 8	S T A T E P P O R T S	CERTIFICATES	SAM	R E C O R D S	8 N N	M A N D A	G O V E P P R O V E D M M E N T T O N L Y	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 07511	e. Built-up Asphalt	f.	g.	h.	i.	j. k.	l.	m	. n.	. c). 	p. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			07311	Roofing																					
			07511-4, line 12	Roof Membrane Plies	X	x			х	x	X	X	X	,	FIO										
			07511-4, line 17	Backer Sheet	x	X			X	x	X	X	X	,	FIO										
			07511-4, line 19	Flashing Sheet	x	x			X	X	X	X	X		FIO										
			07511-4, line 25	Glass-Fiber Fabric	X	x			X	X	X	X	X		FIO										
			07511-4, line 30	Asphalt Primer	x	x			X	X	X	X	X		FIO										
			07511-4, line 32	Roofing Asphalt	X	X			X	X	X	X	X		FIO										

07511-4, line 46	Asphalt Roofing Cement	X	x	X		X	X	X	X	FIO					
07511-4, line 49	Mastic Sealant	X	x	×	()	X	X	X	X	FIO					
07511-4, line 52	Fasteners	X	x	>	()	X	x	X	X	FIO					
07511-4, line 56	Metal Flashing Sheet	X	х	>	()	X	X	X	X	FIO					
07511-4, line 58	Wood Nailer Strips	X	x	>	()	X	X	X	X	FIO					
07511-4, line 61	Cants	X	x	X	()	X	X	X	X	FIO					
07511-4, line 63	Walkway Pads	X	x)	()	X	X	X	X	FIO					
07511-5, line 8	Aggregate Surfacing	X	x	×	()	X	X	X	X	FIO					
07511-5, line 29	Polyisocyanurate Board Insulation	X	x	X	()	X	X	X	X	FIO					
07511-5, line 40	Fasteners, Insulation	X	x	×	()	K	X	X	x	FIO					
07511-5, line 44		X					X		X						
07511-5, line 46	-	X	X							FIO					
07511-5, line 48	Cover Board	X	x	X		X	X	X	X	FIO					
	Shop Drawings	X	x								G AE				

								SI	JBMI [*]	TT <i>P</i> ER 4				STE	R										NTRACT NO DACA 31-0	
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	Scho	ol &	: Mi	iddle	•				,				CON	TRACTO	R					SPE 07 :		N SECTION
					TYI	PE OF	SUE	ВМІТТ	TAL I						CLA FICA	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT			VERNMENT ACTION	
A C T - V - T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	- N S T R U C T - O Z S	SCHEDULES				A M P L E S	O R D S	AZUALS	N F O R M A T O N	GOVAPPN RPN ROVENT	E V I E W E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 07531	e. EPDM Single- Ply	f.	g.	h.	i.	j. k	:. I	. n	n. ı	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			07001	Membrane Roofing																						
			07531-3, line 50	EPDM Sheet	X	X			X	X	x	X	()	X	FIO											
			07531-3, line 58	Poly. Board Insulation	x	x			X	X	х	X	()	X	FIO											
			07531-4, line 19	Sheet Flashing	x	x			X	X	х	X	()	X	FIO											
			07531-4, line 21	Epichlorohydrin Sheet	X	X			X	X	х	X X	(X	FIO											
			07531-4, line 33	Bonding Adhesive	X	X			X	X	х	X X	()	X	FIO											
			07531-4, line 35	Splice Primer & Tape	X	X			X	Х	х	X X	()	X	FIO											

07531-4, line 38	Lap Sealant	X	X	X	X	X	X	X	FIO				
07531-4, line 40	Water Cutoff Mastic	X	x	x	X	X	X	X	FIO				
07531-4, line 42	Metal Battens	X	X	X	X	X	X	X	FIO				
07531-4, line 45	Fasteners	X	x	X	X	X	X	X	FIO				
07531-4, line 48	Accessories	X	x	X	X	X	X	X	FIO				
07531-4, line 55	Thermal Barrier	X	x	X	X	X	X	X	FIO				
07531-5, line 18	Insulation Fasteners	X	x	X	X	X	X	X	FIO				
07531-5, line 21	Insulation Cover Board	X	x	X	X	X	X	X	FIO				
07531-5, line 28	Walkway Pads	X	X	X	X	X	X	X	FIO				
	Shop Drawings	X	x						G A/E				

								SU	BMIT (E			EG -10)		ΓEF	₹									ITRACT NC DACA 31-0	
TITI	E AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle				,				CONT	RACTOR	₹					SPE 076		N SECTION
					TYF	PE OF	SUB	MITTA	\L						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-ZG%	I N S T R U C T I O N S	S C H	S T A T E E P O R T S	CERTIFICATES	S A M	R E C O R D S	A N	N F C F R M A A A A A A A A A A A A A A A A A A	V A E P R P N R	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 07620	e. Sheet Metal flashing,	f.	g.	h.	i.	j. k.	I.	m.	. n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			07020	Trim & Accessories																					
			07620-2, line 18	Stainless – Steel Sheet	X	x			х	X	X		X	F	FIO										
			07620-2, line 21	Galvanized Steel Sheet	X	X			х	X	X		X	F	FIO										
			07620-2, line 25	Aluminum Sheet	X	X			Х	X	X		X	F	FIO										
			07620-2, line 31	Reglet	X	X			X	X	X		X	F	FIO										
			07620-2, line 37	Solder	X	X			X	X	X		X	F	FIO										
				Solder for Stainless Steel	X	X			X	X	X		X	F	FIO										

07620-2, line 42	Stainless – Steel Welding Rods	X	X		()	X	Х	X	FIO						
07620-2, line 45	Fasteners	X	x	3	()	X	X	X	FIO						
07620-2, line 48	Asphalt Mastic	X	x	3	()	X	х	X	FIO						
07620-2, line 51	Mastic Sealant	X	x	3	()	X	x	X	FIO						
07620-2, line 53	Elastomeric Sealant	X	x		()	X	X	X	FIO						
07620-2, line 56	Epoxy Seam Sealer	X	x		()	X	X	X	FIO						
07620-2, line 59	Adhesives	X	x	2	()	X	x	X	FIO						
07620-2, line 64	Polyethylene Underlayment	X	x		()	X	X	X	FIO						
07620-3, line 1	Metal Accessories	X	x	2	()	X	Х	X	FIO						
07620-3, line 5	Gutter Screen	Х	x		()	X	X	X	FIO						
07620-3, line 8	Roofing Cement	x	х		()	X	x	X	FIO						
07620-4, line 67	Coil – Coated Galvanized Steel Sheet Finish		x		()	X	х	X	FIO						
07620-5, line 17	Flexible Sheet Membrane Flashing		x		()	X	x	X	FIO						
	Shop Drawings	X	X							G A/E					

						SC			I AL R 415		GIS 10)	IEI	K										ITRACT NO DACA 31-0	
AND L	LOCA		Lincoln Multicultural High shington, D.C.	School &	& Mi	ddle	Sch	iool			·				CONT	RACTOR	?							N SECTION
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b.	C.	d.	e.	f. g	. h.	i.	j.	k.	I.	m.	n. (0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
		0/716	Roof Expansion Assemblies																					
			Bellows – Type Roof Expansion Joint Material	x x			2	X			X	(FIO											
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- F	RANS- ITTAL NO.	RANS- ITTAL E NO. N O.	RANS- ITTAL E PARAGRAPH NO. N O.	Washington, D.C. T	Washington, D.C. TYPE COMBINED TO THE COMBINE	Washington, D.C. TYPE OF SUE I N N S T T D R R U A C W T T G N A N O T G N A S S b. c. d. e. f. g. h. O7716 Roof Expansion Assemblies O7716-2, Bellows – Type Roof In Expansion Joint	Washington, D.C. TYPE OF SUBMITTA I TYPE OF SUBMITTA I N N S T S S D R C R U H A C E W T D D I I U U H A N O L T G N E A S S S S b. c. d. e. f. g. h. i. O7716 Roof Expansion Assemblies O7716-2, Bellows – Type Roof Expansion Joint	TYPE OF SUBMITTAL	TYPE OF SUBMITTAL	Type of Submittal Type	Type of Submittal	Type of Submittal	Type OF SUBMITTAL	Vashington, D.C. TYPE OF SUBMITTAL CLA FICA CLA CLA	Vashington, D.C. TYPE OF SUBMITTAL CLASSIFICATION	Vashington, D.C.	Vashington, D.C.	Type of Submittal Classification Schedule Day Submittal Classification Schedule Day Submittal Classification Schedule Day Submittal Submitta	Type of Submittal Classi- Fication Schedule dates Contractor Schedule dates	Type of Submittal Classification Schedule Dates Submittal Classification Schedule Dates Submittal Classification Schedule Dates Submittal Su	Type of Submittal Classification Contractor Schedule dates Contractor Contractor Schedule dates Contractor Contractor	Vashington, D.C. Type of Submittal Type of Type of Submittal Type of Submittal Type of T	Vashington, D.C. Type of Submittal Classification Schedule Dates Contractor Cont	Vashington, D.C. Type of Submittal Classication Contractor Schedule Dates Contractor Contractor Schedule Dates Contractor Contra

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			07720	Roof Accessories																						
			07720-2, line 56	Roof Curbs	X	x							2	X		G	A/E									
			07720-3, line 2	Equipment Supports	X	X							2	X		G	A/E									
			07720-3, line 9	Roof Hatches	X	X							3	X		G	A/E									
			07720-3, line 29	Heat and Smoke Vents	X	X							2	X		G	A/E									
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				Roof Top Equipment Supports																					
				Portable Support System	x	x			X	X	x		X	X											
				Shop Drawings	X	X									G	A/E									
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				Sprayed Fire resistive Material																						
			07811-5, line 5	Cementitious Sprayed Fire – Resistive Material	X	X		X	X X	(X	X		X	FIC)										
			07811-5, line 13	Sprayed – Fiber Fire – Resistive Material	X	X		X	X >	()	X	X		X	FIC)										
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			Fire Resistive Blanket Fire Protection	X				x				X	F	FIO										
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	TRANS- MITTAL NO.	TRANS- T MITTAL E MO. N O. b. c.	TRANS- MITTAL NO. N O. b. c. d. 07812	TRANS- T SPECIFICATION DESCRIPTION OF ITEM SUBMITTED NO. N O. D. C. d. e. 07812 Duct Blanket Fire Protection 07812-3, Fire Resistive Blanket	TRANS- T SPECIFICATION PARAGRAPH NUMBER DESCRIPTION OF ITEM SUBMITTED D A T A D C. d. e. f. 07812 Duct Blanket Fire Protection 07812-3, Fire Resistive Blanket x	TRANS- T SPECIFICATION PARAGRAPH NUMBER NO. DESCRIPTION OF ITEM SUBMITTED DI A N T G A S D. C. d. e. f. g. 07812 Duct Blanket Fire Protection 07812-3, Fire Resistive Blanket x	TRANS- I SPECIFICATION PARAGRAPH NUMBER DESCRIPTION OF ITEM SUBMITTED D I I A N O T G N A S S b. c. d. e. f. g. h. 07812 Duct Blanket Fire Protection 07812-3, Fire Resistive Blanket x	E AND LOCATION Bell/Lincoln Multicultural High School & Middle Washington, D.C. TRANS- TRANS- MITTAL NO. DESCRIPTION OF NUMBER TYPE OF SUBMITTAL A C E W T D A N O L T G N E A S S S D R C R U H A C E R U H A C E R U H A C E R U H A C E R U H A C E R U H A C E R U H A C E R U H A S S S S D R C R U H A S S S S D R C R U H A C E R U H A C E R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A S S S S D R C R U H A C E	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. TYPE OF SUBMITTAL I TYPE OF SUBMITTAL I N N S S T T S	CER 4 E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	TRANS- T SPECIFICATION DESCRIPTION OF NUMBER Number	TRANS- T SPECIFICATION SPECIFICATION Multicultural High School & Middle School Washington, D.C. TYPE OF SUBMITTAL	CER 415-1-10 E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	CER 415-1-10 E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. Type of Submittal	CONT	CONTRACTOF CON	CONTRACTOR CON	CONTRACTOR Sell/Lincoln Multicultural High School & Middle School Washington, D.C. TYPE OF SUBMITTAL CLASSIFICATION SCHEDULE DATES CONTRACTOR SCHEDULE DATES CONTRACTOR SCHEDULE DATES CONTRACTOR CONTRACT	CONTRACTOR CON	CONTRACTOR CON	CONTRACTOR Sell/Lincoln Multicultural High School & Middle School Washington, D.C. CONTRACTOR CONTR	CONTRACTOR SPECIFICATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. Type of submittal CLASSIFICATION SCHEDULE DATES CONTRACTOR ACTION SCHEDULE DATES CONTRACTOR ACTION SCHEDULE DATES CONTRACTOR ACTION ACTION	CONTRACTOR SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SUBMITTAL SPECIFICATION SPECIFICATION SUBMITTAL SPECIFICATION SPECIFICATION

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			07841	Through Penetration Fire Stop Systems																						
			07841-4, line 21	Fire Stopping	X X	(х	Х			x	F	Ю											
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					TYPE OF	SUE	BMITT	AL		1		1	1	CL/ FIC/	ASSI- ATION	-		CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	NUMBER	DESCRIPTION OF ITEM SUBMITTED	D R A W I N G S	- N S T R U C T - O N S	SCHEDULES	STATEMENTS	R E P O R T S	CERTIFICATES	S A M P L E S	RECORDS	A N U A	I N F O R M A T O N L N Y	G O V A P P N R O V B N D D T D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	c.		e.	f. g.	h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	٧.	w.	X.	y.	Z.	aa.
			07842	Fire Resistive Joint Systems																					
			07842-3, line 44	Head – of – Wall, Fire Resistive Joint system	x x				X	X			X	X											
				Shop Drawing Joint System											G	A/E									
						-																			
						-																			
						-																			

								Sl	JBMI7 (E			REG 1-10		ΤE	R									NTRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High Shington, D.C.	cho	ol &	: Mi	ddle				,	,			CONT	RACTOF	?					I	CIFICATIO 900	N SECTION
					TYF	PE OF	SUE	BMITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION		VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A S - Z G S	I N S T R U C T - O N S	0 U U U U U U U U U	S T A T E M E P O R T S	C E R T I F I C A T E S	5	R E C O R D S	N	M A V J A	I N G O V A E P M R P A N R T O N E V O L N T D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	l.	m	n. n	. с). 	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			07900	Joint Sealers								+	+												
			07900-3, line 38	Elastomeric Joint Sealants	X		X		x	X	X		X		G	A/E									
			07900-4, line 57	Latex Joint Sealants	X		X		X	X	X		X		G	A/E									
			,	Miscellaneous Joint Sealants	x		X		Х	X	X		X		G	A/E									
			07900-5, line 42	Compression Seals	X		X		X	X	X		X		FIO										
			07900-6, line 14	Joint Sealant Backing	X		X		X	X	X		X		FIO										
			07900-6, line 37	Miscellaneous Materials	X		x		X	X	X		X		FIO										
			07900-6, line 49	Joint Fillers for Concrete Paving	X		X		X	X	X		X		FIO										

								SL	JBMIT (E			EGI -10)		ER										ITRACT NC DACA 31-0	
TITI	LE AND	LOC		Lincoln Multicultural High S hington, D.C.	Scho	ol &	Mi	ddle								CONT	RACTOF	₹					SPE 08 1		N SECTION
					TYI	PE OF	SUB	MITT	AL I				1	F	CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	\circ CHEDULE \circ	S T A T E M E P O R T S	C	S A M P L	RECORDS	O & M M A N U A L S	N F O R M A T I	G O V A E P R P N R O N E V L N T D	W E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	р). q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			08110	Steel Doors & Frames																		1			
			08110-3, line 9	Interior Doors	X	X				X	X		X		G	A/E									
			08110-3, line 14	Exterior Doors	x	x				X	X		X		G	A/E									
			08110-3, line 19	Door Louvers	X	X				X	X		X		G	A/E									
				Vision Lite Systems	X	X				X	X		X		G	A/E									
			line 33	Frames	X	X				X	X		X		G	A/E									
			line 39	Door Silencers	X	X				Х	X		X		G	A/E									
			line 42	Plastic Guards	X	X				X	X		X		G	A/E									
			08110-3, line 45	Supports & Anchors	X	X				X	X		X		G	A/E									
				Shop Drawings	X	X									G	A/E									

								SL	JBN		TAL R 41		EGI -10)	ST	ER										CON	TRACT NO DACA 31-0).)0-D-0039
TITI	E AND 1	LOC	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	Scho	ol &	Mi	ddle	Scl	hoo	1							CONT	RACTOF	?					SPE0 081		N SECTION
					TYF	PE OF	SUB	MITT	AL				•	1	C FIC	LASSI CATIO	il- DN			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GOV A	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	S	I N S T R U C T I O N S	0 C H E D D L E 0	STATEMENTS	REPORTS	CERTIFICATES	Δ	R E C O R D S	O & M M A N U A L S	N F O R M A T I		A P P R O V E D	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	0.	p.	(q.	r.	S.	t.	u.	V.	w.	X.	y.	Z.	aa.
			08163	Sliding Aluminum Framed Glass doors																							
			08163-2, line 64	Sliding Door	X	X					X	x		X	FIC)											
				Shop Drawings	x	X											G	A/E									
						İ																					
<u> </u>						₩																					
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								SL	JBMIT (E			EGI -10)	STI	ER										NTRACT NC DACA 31-0	
TITI	LE AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle								CONT	RACTO	२					SPE 082		N SECTION
					TY	PE OF	SUB	MITT	AL	1				FI	CATION	-		CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	SCHEDULES	S T A T E M E P O R T S	CERTIFICATES	A M	RECORDS	O & M M A N U A L S	N F O R M A T I	G O V A E P N R O N E V N E D T D	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 08211	e. Flush Wood Doors	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			08211	Flush Wood Doors																					
			08211-3, line 3	Doors for Transparent Finish	X	X				X	X		x		G	A/E									
			08211-3, line 15	Particle Board Core	X	x				x	x		X		G	A/E									
			08211-3, line 25	Interior Veneer Faced Doors	X	x				X	X		X		G	A/E									
			08211-3, line 44	Fire Rated Doors	X	X				X	X		X		G	A/E									
			08211-3, line 60	Metal Louvers	X	x				X	X		X		G	A/E									
			08211-4, line 1	Fire Door Louvers	X	X				X	X		x		G	A/E									
			08211-4, line 7	Metal Frames for Light Openings in Fire Doors		X				X	x		X		G	A/E									
				Shop Drawings	X	X									G	A/E									

								Sl	JBMI ⁻			REG 1-10		TE	R										NTRACT NC DACA 31-0	
TITI	E AND	LOC		/Lincoln Multicultural High S shington, D.C.	cho	ol &	Mi	ddle					<u>, </u>				CONT	RACTOR	₹					SPE 082		N SECTION
					TYI	PE OF	SUE	BMITT	AL						CLAS: FICATI	SI- ION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR A W - N G S	I N S T R U C T I O N S	SCHEDULES	S T A T E E P O R T S S	C E R T I F I C A T E S	S	S R C C R C C R C C R C C R C C R C C R C C R C C R C C R C C R C C R C C R C	R I	M A N U A	I N G G N N F A N N F A N Y T N E O L N N Y T	A P P R P N R V	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 08255	e. Packaged Steel Door	f.	g.	h.	i.	j. k	. l.	m	n. n	1. (Э.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			00233	Assembly																						
				Composite Type Fire Doors	X	X			X	X	X		X			G	A/E									
			08255-2, line 7	Door Finish	X	X			X	X	X		X			G	A/E									
			08255-2, line 12	Steel Frame	X	X			х	Х	X		X	,		G	A/E									
			08255-2, line 12	Steel Frame	X	X			X	X	X		X			G	A/E									
			08255-2, line 16	Operating Hardware	X	X	X		х	X	X		Х			G	A/E									
			08255-2, line 23	Interconnecting Device	X	X	X		Х	X	X		X	,		G	A/E									
			08255-2, line 26	Fire Detection	X	X	X		х	X	X		х			G	A/E									
				Shop Drawings	х	Х										G	A/E									

								SI	UBMI ⁻	TTA ER 4				ER	?									NTRACT NO DACA 31-0	
TITL	E AND 1	LOCA	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	Scho	ol &	Mi	ddle			<u> </u>	/				CON	TRACTO	R					SPE 083		N SECTION
					TYF	PE OF	SUE	BMITT	ΓAL		1		1		CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S	I N S T R U C T I O N S	SCHEDULES	STATE MENTS	CERTIFICATES	S	RECORDS	O & M A N U A L S	N F O R M A T I	O V A E P N R O M O N E V	E V I E W E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. l.	m	. n.	0.		p. q.	r.	S.	t.	u.	V.	W.	x.	y.	Z.	aa.
			08330	Interior Overhead Coiling Counter Doors		\perp																			
			08330-2, line 44	Door Curtain	х	x	x			X	X		X		G	A/E									
			08330-2, line 48	End Locks	X	X	X			X	X		X		G	A/E									
			08330-2, line 55	Bottom Bar	x	X	X			x	X		X		G	A/E									
			08330-2, line 65	Hood	X	X	X			X	X		X		G	A/E									
			08330-3, line 8	Integral Sills	Х	X	X			X	X		X		G	A/E									
			08330-3, line 11	Push / Pull Handles	X	X	X			X	X		X		G	A/E									

08330-3, line 31	Counter Balancing Mechanism	x x	x	Х	X	X		G	A/E				
08330-3, line 62	Finishes	x x	x	X	X	X		G	A/E				
08330-4, line 10	Manual Door Operators	хх	X	х	X	X		G	A/E				
08330-4, line 13	Electric Door Operators	x x	x	X	x	X		G	A/E				
	Shop Drawings	x x						G	A/E				
						+							
				-									
				_			+						
							T						
									•				
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								SI	UBM	IITT (ER				STE	ΞR										NTRACT NO DACA 31-0	
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	z Mi	iddle		•			,				CON	TRACTO	R					SPE 083		N SECTION
					TYF	PE OF	SUE	ВМІТТ	ΓAL						CL. FIC.	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT		GO	VERNMENT ACTION	
A C T - V - T Y N O	TRANS- MITTAL NO.	I T E M NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	DATA	DRAW-NGS	-	HEDULES	STATEMENTS .	R E P O R T S		S A M P L E S	R E C O R D S			N F M C E \\N E \\T E \\T	P E V V R I D E W W E E R	SUBMIT		MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 08333	e. Overhead Coiling Doors (Automatic Resetting)	t.	g.	h.	i.	j.	k.	l.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			08333-2, line 33	Curtain	X	X				>	K 2	X		X		G	A/E									
			08333-2, line 40	Curtain Jamb Guides	X	X				>	K 2	X		X		G	A/E									
			08333-2, line 46	End Locks	X	X				>	x 2	X		X		G	A/E	:								
			08333-2, line 50	Bottom Bar	X	X				>	x	X		X		G	A/E									
			08333-2, line 53	Brackets	X	X				>	x 2	X		X		G	A/E									
			08333-2, line 56	Hood	X	X				>	K 2	Х		X		G	A/E									

	08333-2, line 65	Smoke Seals	X	X			X	X		x	G	A/E					
	08333-3, line 1	Counter Balancing Mechanism	X	X			X	Х		х	G	A/E					
	08333-3, line 35	Finishes	X	X			X	х		х	G	A/E					
	08333-3, line 42	Electric Door Operators	X	X			X	X		х	G	A/E					
		Shop Drawings	X	х							G	A/E					
																	
									-								
		_					-		-								
		1						-	+								
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								Sl	JBM		TAL R 41			STE	ER										NTRACT NO DACA 31-0	
TITI	LE AND 1	LOC	EATION Bell Was	/Lincoln Multicultural High shington, D.C.	Scho	ol &	Mi	ddle	Sch	iool							CONT	RACTOR	?					SPE 083		N SECTION
					TY	PE OF	SUE	MITT	AL				1	1	CL/ FIC/	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	ACTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	PARAGRAPH NUMBER	N DESCRIPTION OF ITEM SUBMITTED	D A T A	N G S	I N S T R U C T I O N S	0 U U U U U U U U U	STATEMENTS	R E P O R T S	O	SAMPLES	R E C O R D S	O & M M A N U A L S	I N F O R M A T O N L N Y	GOVERN ROVENT	E V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.		e.	f.	g.	h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	w.	X.	y.	Z.	aa.
			08334	Overhead Coiling Grill (Parking Garage)																						
			08334-2, line 37	Over Head Coiling Grille Curtain	e x	X					X	X		X		G	A/E									
			08334-2, line 45	End Locks	x	X					X	X		X		G	A/E									
			08334-2, line 48	Bottom Bar	x	X					X	X		X		G	A/E									
			08334-2, line 52	Curtain Jamb Guides	X	X					X	X		X		G	A/E									
			08334-2, line 59	Hood	х	X					X	X		X		G	A/E									
			08334-3, line 4	Push / Pull Handles	X	X					X	X		X		G	A/E									

08334-3, line 8	Locking Device	X	X		X	X	X	G	A/E				
08334-3, line 14	Chain Lock Keeper	X	x		X	X	X	G	A/E				
08334-3, line 18	Mounting Tube Frame	X	X		X	X	X	G	A/E				
08334-3, line 23	Counter Balancing Mechanism	X	x		X	X	X	G	A/E				
08334-3, line 54	S.S. Finish	x	X		X	X	X	G	A/E				
08334-4, line 1	Electric Grille Operators	S X	X		X	X	X	G	A/E				
	Shop Drawings	Х	x	+				G	A/E				
	onop on mige												
					1								

								S	UBI				EG		ΓER											ITRACT NO DACA 31-0	
TITI	LE AND 1	LOC		l/Lincoln Multicultural High S shington, D.C.	Scho	ol &	Mi	iddl	e Sc	choc	ol		•					CONT	RACTOR	1					SPE 083		N SECTION
					TYF	PE OF	SUE	BMIT	TAL				1		FI	CLAS	SSI- TION		5	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	PARAGRAPH NUMBER	N DESCRIPTION OF ITEM SUBMITTED	D A T A	N G S	- NSTRUCT-ONS	SCHEDULES	A T E M E N T S			S A M P L E S	O R D S		N F O R M A T I O N	0 N	G O V E R N M E N T	R E > - E S E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 08335	e. Self – Opening security	f.	g.	h.	i.	j.	k.	I.	m	. n.	0.	. p.		q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			00000	Grille)																							
			08335-1, line 62	Grille Curtain	X	x	X				X	X		X			G	A/E									
			08335-1, line 66	Bottom Bar	x	x	X				X	X		X			G	A/E									
			08335-2, line 2	Guides	X	x	X				X	X		X			G	A/E									
			08335-2, line 5	Brackets	X	x	X				X	X		X			G	A/E									
			08335-2, line 8	Hoods	X	x	X				X	X		X			G	A/E									
			08335-2, line 12	Electric Motor Operator	X	x	X				X	X		X			G	A/E									
								1															1				1

08335-2, line 29	Self-Opening Mechanism	X	X	X		X	X	X	G	A/E				
08335-2, line 35	Test & Reset Feature	X	X	X		X	X	X	G	A/E				
08335-2, line 40	Painting	X	X	x		X	X	X	G	A/E				
	Shop Drawings	X	X						G	A/E				
													,	· · · · · · · · · · · · · · · · · · ·

								SL	JBMIT (E			EGI -10)		EF	3									NTRACT NO DACA 31-0	
TITI	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High shington, D.C.	Scho	ol &	Mi	ddle				,				CON	TRACTO	२					SPE 083		N SECTION
					TYI	PE OF	SUB	вмітт	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	SCHEDULES	S T A T E E M P O R T T S S	I C A T E S	S A M P L E S	E C O R D S	S	N F O R M A T I O N	O V A R E F A N F T O M O	E E V E E W E E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 08347	e. Wood Sound Control	f.	g.	h.	i.	j. k.	I.	m.	n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
				Doors								-													
			08347-3, line 12	Doors	х	x			x		x		x		G	A/E									
			08347-3, line 21	Frames	X	x			X		X		X		G	A/E									
			08347-3, line 57	Factory Finishing	X	x			X		X		X		G	A/E									
				Shop Drawings	X	X									G	A/E									
												\dagger													

								Sl	JBMIT (E	TAI				ER											NTRACT NO DACA 31-0	
TITI	E AND	LOCA		Lincoln Multicultural High Shington, D.C.	Scho	ol &	Mi	ddle								С	ONT	RACTOR	R					SPE 08 4		N SECTION
					TY	PE OF	SUB	BMITT	AL					F	CLASSI- FICATION	N .		,	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	о С Н п D О л п о	S T A T E M P O R T S	C	SAM	RECORDS	O & M M A N U A L S	N F O R M A T I	GOVERNMENT ONLY	0	R E > - E S E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 08410	e. Aluminum Entrances	f.	g.	h.	i.	j. k.	l.	m.	n.	0.	F	o. q		r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
				and Storefronts																						
			08410-4, line 46	Framing Members	X	X				x	X		X		G	A	/E									
				Brackets and Reinforcements	X	X				x	X		X		G	A	/E									
			08410-4, line 55	Fasteners and Accessories	X	x				X	X		X		G	A	/E									
			08410-4, line 65	Flashing	X	x				X	X		X		G	A	/E									
			08410-5, line 8	Doors	X	x				X	X		X		G	A	/E									
			line 41	Hardware	X	X				X	X		X		G		/E									
				Shop Drawings	X	X									G	Α	/E									

								SL	JBMIT (E			EG -10)		ER										NTRACT NO DACA 31-0	
ΓITL	E AND I	LOCA		Lincoln Multicultural High hington, D.C.	Scho	ol &	Mi	ddle				•				CONT	RACTOF	₹						CIFICATIO 520	N SECTION
					TYI	PE OF	SUB	MITT	AL					CL FIC	ASSI- ATION T			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION	GO	VERNMENT ACTION	
ACT->-TY ZO	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	8 C H E D U L E 8	S T A T E P P O R T T S	CERTIFICATES	s	R E C O R D S	O & M M A N U A L S	N F O R M A T O	E V	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	. I.	m	. n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			08520	Aluminum Windows							-														
			08520-3, line 35	Double Hung	X	X			х	X	X		X		G	A/E									
			08520-3, line 64	Horizontal Sliding Windows	x	x			X	X	X		X		G	A/E									
			08520-4, line 8	Projected Windows	х	X			X	X	X		X		G	A/E									
			08520-4, line 18	Fixed windows	Х	x			X	X	X		X		G	A/E									
				Shop Drawings	x	X									G	A/E									
											1	1	1												
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_							-				+		+												

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TITI	E AND I	LOCA		Lincoln Multicultural High hington, D.C.	Scho	ol &	Mic	ldle								CONT	RACTO	₹					SPE 08 7		N SECTION
					TYI	PE OF	SUBI	MITT	AL				1		CLASSI- FICATION	-		CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	ACTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A S - Z G %	- N S T R U C T - O Z S	\circ C H H D D L H \circ	S T A T E M E P O R T S	C	S A M P L	R E C O R D S	O & M M A N U A L S	N F O R M A T I	V A E P I R P N R	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 08710	e.	f.	g.	h.	i.	j. k.	l.	m.	n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			08/10	Finish Hardware																					
			08710-3, line 32	Screws & Fasteners	x			x	х	X	X		X		G	A/E									
			08710-3, line 39	Hinges	Х			X	x	X	X		X		G	A/E									
			08710-3, line 53	Pivots	х			X	х	X	X		X		G	A/E									
			08710-3, line 58	Floor Closers	х			X	x	X	X		X		G	A/E									
			08710-4, line 9	Flush Bolts	x			X	х	X	X		X		G	A/E									
			line 20	Coordinators	Х			X	x	X	X		X		G	A/E									
			08710-4, line 30	Locks	X			X	X	X	X		X		G	A/E									

08710-4, line 37	Lock Trim	X	Х	Х	X	X	X	G	A/E	
08710-4, line 45	Exit Devices	x	x	x	x	x	x	G	A/E	
08710-4, line 61	Surface Door Closers	x	x	x	X	X	X	G	A/E	
08710-5, line 14	Push Plates	x	x	x	X	x	х	G	A/E	
08710-5, line 21	Pull Plates	x	х	x	X	X	x	G	A/E	
08710-5, line 27	Protective Plates	x	x	x	X	x	x	G	A/E	
08710-5, line 36	Door Stops & Holders	x	x	x	X	x	x	G	A/E	
08710-5, line 47	Threshold, Weather stripping & Gasket	x	x	x	X	X	х	G	A/E	
08710-5, line 58	Silencers	x	х	x	X	x	x	G	A/E	
08710-5, line 63	Smoke Detectors & Magnetic Holders	x	х	Х	X	X	X	G	A/E	
08710-6, line 9	Finishes	x	х	Х	X	X	X	G	A/E	
08710-6, line 30	Keying	X	X	Х	X	X	X	G	A/E	
08710-6, line 48	Key Control	x	х	х	X	X	x	G	A/E	
	Shop Drawings	хх						G	A/E	

								SU					EGI -10)	ST	ER										TRACT NO DACA 31-0	
TITL	E AND I	LOC	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	Schoo	ol &	Mi	ddle									CONT	RACTOF	₹					SPE(N SECTION
					TYP	E OF	SUB	MITTA	٩L	1		1	1		CL FIC	ASSI- ATION			CONTRACT	OR ATES		CONTRA ACTI	CTOR ON	GOV	ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	- Z O T R U C T - O Z O	SCHEDULES	STATEMENTS	REPORTS	C = R + - F - C A + E S	SAMPLES	RECORDS	O&M MANUALS	N F O R M A T O N	E \	E V R I E W E E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
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			08716	Power Door Operators																						
			08716-2, line 39	Swing Door Operators	X	x	X					X		X		G	A/E									
				Shop Drawings	X	X										G	A/E									
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					TYF	PE OF	SUB	MITT	AL						CLAS FICAT	SSI- FION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	ACTOR ION	GO	VERNMENT ACTION	
A C T - V - T Y Z O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-ZGS	I N S T R U C T I O N S	\circ C H \circ D J L \circ	S T A T E E M P O R T S S	C E R T I F I C A T E S	S A M P	R E C O R D S	O & M M A N U A L S	N	F 0	GOVEPRN PROVENT	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m	. n.	0.		p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			08800	Glass & Glazing																						
			08800-4, line 31	Clear Float Glass	x				x	X	X		X	F	FIO											
			08800-4, line 33	Tinted Float Glass	X				X	X	X		X			G	A/E									
			08800-4, line 46	Wire Glass	X				x	X	X		X	F	FIO											
			08800-4, line 49	Polished Wire Glass	x				X	X	X		X	F	FIO											
			08800-4, line 59	Uncoated Clear Heat – Treated Float Glass	X				x	X	X		X	F	FIO											
			08800-4, line 62	Uncoated Clear Fully Tempered Float Glass	X				x	X	X		X	F	FIO											
			08800-4,	Uncoated Tinted Heated	X				X	X	X		X	 	FIO											

	line 64	- Treated Float Glass										
	08800-5, line 2	Uncoated Tinted Fully Tempered Float Glass	x	x	X	x	X	FIO				
	08800-5, line 4	Ceramic Coated Heat Treated Spandrel Glass	X	x	X	x	X		G A/E			
	08800-5, line 8	Ceramic Coated Fully Tempered Spandrel Glass	x	x	X	X	X		G A/E			
	08800-5, line 52	Laminated Safety Glass	x	x	X	x	X	FIO				
	08800-6, line 11	Pyrolytic Coated Glass	x	x	X	x	X	FIO				
	08800-6, line 31	Elastomeric Sealant	X	x	X	X	X	FIO				
	08800-6, line 52	Preformed Butyl- Polyisobutylene Glazing Tape	x	x	X	X	X	FIO				
	08800-7, line 23	Dense Elastomeric Compression Seal Gaskets	X	x	X	X	X	FIO				
	08800-7, line 31	Cellular Elastomeric Preformed Gaskets	X	X	X	X	X	FIO				

								Sl	JBM			RE 5-1-		STE	ER										NTRACT NO DACA 31-0	
ΓITL	E AND I	LOCA		Lincoln Multicultural High S shington, D.C.	cho	ol &	Mi	ddle		•							CON	TRACTOF	3						CIFICATIO 814	N SECTION
					TYF	PE OF	SUB	MITT	AL						C FI	LASSI- CATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION	GO	VERNMENT ACTION	
ACTIVITY	TRANS- MITTAL NO.	I T E M NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	ω \square \square \square \square \square \square \square	S T A T E M E N T S	R	CERTIFICATES	SAMPLES	RECORDS	O & M M A N U A L S	N F O R M A T	G O V A E P R R R M O N E V T D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			08814	Mirror Glass																						
			08814-3, line 3	Anneal Float Glass	x	X			X	()	X			x	FIC)										
			08814-3, line 10	Tempered Float Glass	X	x			X	()	X			X	FIC)										
			08814-3, line 22	Silvered Mirrored Glass	X	x			X	()	X			X	FIC)										
					-					-					-											
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION 08840 Washington, D.C. CLASSI-FICATION CONTRACTOR SCHEDULE DATES CONTRACTOR ACTION GOVERNMENT ACTION TYPE OF SUBMITTAL C E R A C T Ν 0 S T G O S & S M V E С R E A T E M E N T S D R A W R E P O R T S S A M P L E S R E C O R D S Ρ SUBMIT SPECIFICATION TRANS-R N M E N T V **APPROVAL** MATERIAL TO N A T NEEDED GOVERN-Т **MITTAL** Ε PARAGRAPH **DESCRIPTION OF** NEEDED Υ NO. M NUMBER E W C O C 0 ITEM SUBMITTED 0 0 SUBMIT BY DATE MENT DATE BY REMARKS O N S N G S E S Ν E R 0 D D SNY 0 Ο. Ε b. C. g. m. n. 0. a. S. u. ٧. w. Х. Z. aa. 08840 **Plastic Glazing** Polycarbonate Glazing FIO 08840-2, line 63 08840-3, **Sealants** FIO line 17 08840-3, **Dense Compression** FIO X line 28 Gaskets

								SU	BMIT		_ RI		ST	ER										ITRACT NC DACA 31-0	
TIT	LE AND	LOCA		Lincoln Multicultural High So hington, D.C.	cho	ol &	Mi	ddle				-,				CONT	RACTOR	₹					SPE 092		N SECTION
					TYF	E OF	SUB	MITTA	AL I	1		1	1	(F	CLASSI- TICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA	CTOR ON	GO	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	- Z O - + O C A + O Z O	SCHEDULES	S T A A T E E P O R T S	CERTIFICATES	A M	RECORDS	O & M M A N U A L S	N F O R M A T I	GOVERROVED ONLY	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 09220	e. Portland Cement Plaster	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	р	. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			09220	Portiand Cement Plaster																					
				Metal Supports for Suspended and Furred Ceilings	X	х				x	x		X	FI	0										
			09220-3, line 38	Lath	X	X				X	X		X	FI	0										
			09220-3, line 54	Accessories	X	X				X	X		X	FI	0										
			09220-4, line 29	Plaster Materials	X	X				X	X		X	FI	0										
			line 51	Miscellaneous Materials						X	X			FI											
			09220-4, line 62	Acoustical Sealant	X	X				X	X		X	FI	0										
			09220-5,	Plaster Mixes and Compositions	X	X				X	X		X	FI	0										

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ND LO	OC <i>A</i>	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	School &	& Mi	iddle	e Sc								CONT	RACTOF	₹					SPE0 092		N SECTION
				TYPE O	F SUE	BMITT	ΓAL						CL. FIC.	ASSI- ATION			CONTRACT	OR ATES		CONTRA ACTI	CTOR ON	GOV	ERNMENT CTION	
TAL E	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D R A W D I A N T G S	C T I	E D U	S T A T E M E N T S	R E P O R T S	CERTIFICATES	_ ^	R E C O R D S	O & M M A N U A L S	N F O R M A T O I	E V	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
o. c	C.	d.	e.	f. g.	h.	i.	j.	k.	l.	m.	n.	0.	p.	q.	r.	s.	t.	u.	V.	w.	x.	y.	Z.	aa.
		09253	Gypsum Sheathing																					
		09253-2, line 20	Gypsum Sheathing Board	x	X		X		X			X	FIO											
		09253-2, line 37	Accessory Materials	x	x		x		X			X	FIO											
							<u> </u>																	
					-	-			1	-	-													
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION 09260 Washington, D.C. CONTRACTOR SCHEDULE DATES GOVERNMENT ACTION TYPE OF SUBMITTAL CLASSI-FICATION CONTRACTOR ACTION C E R A C T Ν 0 S T G O S & S M A T R E M P E O R T S S V E R С R E D R A W S A M P L E S R E C O R D S Р SUBMIT SPECIFICATION C T E D TRANS-**APPROVAL** MATERIAL TO R N M E N T N A T NEEDED Т MITTAL Ε PARAGRAPH **DESCRIPTION OF** GOVERN-C A T E S NEEDED Υ NO. M NUMBER C O ITEM SUBMITTED 0 0 Ε **SUBMIT** BY DATE MENT С DATE BY REMARKS N G S Ō Ν N S E S 0 Ε D D SNY 0 Ο. D Ε Е b. C. g. h. k. m. n. 0. p. ٧. a. s. u. w. Х. Z. aa. Gypsum Board 09260 **Assemblies** Steel Suspended Ceiling x x FIO 09260-2, line 46 and Soffit Framing 09260-3, Steel Partition and Soffit x FIO X line 14 Framing Exterior Gypsum Panels x FIO 09260-4, line 16 for Ceilings and Soffits 09260-5. Joint Treatment FIO line 10 Materials FIO **Acoustical Sealant** X 09260-5. X X line 42 FIO **Auxiliary Materials** 09260-5. line 48 09260-6. **Texture Finishes** FIO X x x line 5

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b.	C.	d.	6. Gyncum Board Shaft	f.	g.	h.	i.	j. k	i. I	. n	n. n	٦.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			Assemblies																						
		09265-2, line 38	Assembly Materials	X		X		x	Х	X	X	· >	K	FIO											
				X		X		х	X	Х	X	.)	X	FIO											
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								Sl	JBMI7 (E	ΓΤΑ ER 4				EF	₹									NTRACT NO DACA 31-0	
TITI	E AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	z Mi	ddle								CONT	TRACTO	₹					SPE 09 3		N SECTION
					TYI	PE OF	SUE	BMITT	AL				1		CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR AW INGS	I N S T R U C T I O N S	0 U U U U U U U U	S T A T E E P P O R T S	C	S A M P L	E C	A N U A	I F	F O V A R F A N F F O M C	E E V E E W E E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 09310	e. Ceramic Tile	f.	g.	h.	i.	j. k.	. l.	m.	n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			09310	Ceramic Tile																					
			09310-4, line 10	Tile Products	x	x				X	X		X		G	A/E									
			09310-4, line 50	Stone Thresholds	X	x				X	X		X	F	FIO										
			09310-4, line 65	Setting Materials	X	x				X	X		X	F	FIO										
			09310-5, line 24	Grouting Materials	X	X				X	X		X		G	A/E									
			line 41	Elastomeric Sealants	X	x				X			X		FIO										
			09310-6, line 11	Miscellaneous Materials	X	X				X	X		X	F	FIO										
			09310-6, line 30	Mixing Mortars and Grout		x				X	X		x	F	FIO										
				Shop Drawings	X	X									G	A/E									

								SU	BMIT (E			EGI -10)		ER	1									NTRACT NO DACA 31-0	
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	. Mi	ddle				•				CONT	TRACTO	₹					SPE 09 4		N SECTION
					TYI	PE OF	SUE	MITTA	AL	1	1	1	1		CLASSI- FICATION	-		CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T - O R S	SCHEDULES	S T A T E M P O R T S S	C E R T I F I C A T E S	SA	RECORDS	O & M MANUALS	F O R M A T I	O V A E P R P	E V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	ŗ	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			09400	Terrazzo (Thin Set)																					
			09400-2, line 44	Materials	X	x			X	X	X		X		G	A/E									
			09400-3, line 15	Mixes	х	x			X	X	x		x		G	A/E									
				Shop Drawings	X	Y									G	A/E									
				onop Diannigo												7.4.2									
		-				+						+		+											
							1					†													
														1											
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							1					†													

							,	SUB		TAI R 41				ER										NTRACT NO DACA 31-0	
TITI	E AND 1	LOC		l/Lincoln Multicultural High shington, D.C.	School	& N	Iidc	lle S	choo	ol						CONT	RACTOR	2						CIFICATIO 150	N SECTION
					TYPE	OF SI	JBMI	TTAL					1	CL/ FIC/	ASSI- ATION			CONTRACTO SCHEDULE DA	OR TES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D F L CO	S	C A T E B M B M B M B M B M B M B M B M B M B	R E P O R T S		s	RECORDS	O & M M A N U A L S	N F O R M A	G O V A E P R P N R O E N E T D	E V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	c.		e	f.	g. h	. i	. j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	w.	X.	y.	Z.	aa.
			09450	Flexible Terrazzo Tile (Fritz Tile)																					
			09450-2, line 22	Flexible Terrazzo Tile Colors and Patterns	X	x				x	X		X		G	A/E									
			09450-2, line 28	Flexible Terrazzo Tile	X	x				x	X		X		G	A/E									
			09450-2, line 35	Accessories	X	x				X	X		X		G	A/E									
							+						1												
													1												
							+						-												
												1	1												1

								Sl	JBMIT (E	ΓTΑ ER 4				ΓΕΙ	R										NTRACT NO DACA 31-0	
TITI	E AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle				,				(CONT	RACTOR	₹					SPE 09		N SECTION
					TYI	PE OF	SUB	BMITT	AL						CLASSI FICATIO	il- DN			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	I N S T R U C T I O N S	S C I H D D L H S	S T A T E P P O R T S	CERTIFICATES	SAM	C O	8 N N A N	И F О И F А М И А	G G O V E R N M H O N H T O N T T	A P R O V	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m	. n.	. 0).	p. c	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			09511	Acoustical Panel Ceilings																						
				Mineral – Base Panels – Water Felted	X	X			X	x	X	X	X	ı	FIO											
			09511-3, line 42	Gypsum Board Panels – Vinyl Faced	X	x			Х	X	X	X	X	ļ	FIO											
			09511-3, line 60	Acoustical Ceiling Diffuser	X	x			X	X	X	X	X		FIO											
			09511-3, line 66	Metal Suspension System	X	X			X	X	X	X	X	I	FIO											
			09511-4, line 38	Non-Fire-Resistance Rated Direct hung Suspension System	X	X			x	X	X	X	X	ı	FIO											
			09511-5, line 34		x	Х			х	X	х	Х	X	I	FIO											
				Coordinating Drawings	X	x										G	A/E									

							SI	JBN		TAL R 41			STI	ER										TRACT NO DACA 31-0	
TITI	E AND I	LOC	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	chool &	& Mi	iddle	e Scl	hoo	1						CONT	RACTOF	?					SPE(095		N SECTION
					TYPE O	F SUE	BMITT	AL						CL FIC	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GOV	ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D R A W D I A N T G A S	U C T I O	S C H E D U	STATESESTS	REPORTS	CERTIFICATES	S A M P L E S	RECORDS	O & M M A N U A L S	N F O R M A T I	E V	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f. g.	. h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	x.	y.	Z.	aa.
			09521	Acoustical Wall Panel																					
			09521-2, line 4	Acoustical Wall Panel	x	X				X	x		X		G	A/E									
			,	Back Mounted Acoustical Wall Panels	x	X				X	X		X		G	A/E									
				Oh an Duarrin na												A /F									
				Shop Drawings	X X										G	A/E									
																									-
							_																		
							-																		

AND L									ER 4				ER										TRACT NO DACA 31-0	0-D-0039
	.OC	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Schoo	1 & 1	Mid	dle S								CONT	RACTOF	₹					SPEC 095		N SECTION
				TYPE	OF S	SUBN	/ITTAL					1	CL FIC	ASSI- ATION			CONTRACT	OR ATES		CONTRA ACTIO	CTOR ON	GOVI A	ERNMENT CTION	
ANS- TTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W	STRUCTI	C A H T E E D N		R	S	R E C O R D S	M M A N U A	N F O R M A T I	E P R P N R M O E V	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
b.	C.	d.	e.	f.	g.	h.	i. j	. k	<u>. l.</u>	m.	. n.	0.	p.	q.	r.	S.	t.	u.	v.	W.	x.	y.	Z.	aa.
				x	3	(X	X	X		X		G	A/E									
			Shop Drawings	х	X									G	A/E									
														1										
										-														
T V	TAL O.	TAL EO. MNO.	TAL E PARAGRAPH NUMBER N O. C. d. 09522 09522-1, line 57	TAL E PARAGRAPH NUMBER DESCRIPTION OF ITEM SUBMITTED N O. C. d. e. 09522 Cementitious Wood Fiber Wall Panels 09522-1, Cementitious Wood	SPECIFICATION PARAGRAPH NUMBER O. C. d. E. O9522 Cementitious Wood Fiber Wall Panels O9522-1, Cementitious Wood Fiber Planks	I SPECIFICATION PARAGRAPH NUMBER DESCRIPTION OF ITEM SUBMITTED DES	I SPECIFICATION PARAGRAPH NUMBER DESCRIPTION OF ITEM SUBMITTED DES	I	SPECIFICATION DESCRIPTION OF DESCRIPTION OF N N N N N N N N N	SPECIFICATION DESCRIPTION OF N N N N N N N N N	SPECIFICATION DESCRIPTION OF DESCR	SPECIFICATION DESCRIPTION OF TALL O	I	SPECIFICATION DESCRIPTION OF D N S S R N S N N S S R N N S N N S N N N N	SPECIFICATION DESCRIPTION OF DESCR	SPECIFICATION DESCRIPTION OF ITEM SUBMITTED DESCRIPTION OF DESCR	SPECIFICATION	SPECIFICATION PARAGRAPH NUMBER DESCRIPTION OF ITEM SUBMITTED DESCRIPTION OF A S S S S S S S S S S S S S S S S S S	SPECIFICATION DESCRIPTION OF T S T T S T T S T T	SPECIFICATION DESCRIPTION OF T S S S S S S S S S	NS- T SPECIFICATION DESCRIPTION OF TITEM SUBMITTED TI	Separation Sep	SPECIFICATION DESCRIPTION OF TO DESC	NS- T SPECIFICATION DESCRIPTION OF TO N N N N N N N N N

							S	UBN				EGI -10)		ER										ITRACT NO DACA 31-0	
TITI	E AND I	LOC		/Lincoln Multicultural High S shington, D.C.	School &	& Mi	iddl	e Sc	hoc	ol		•				CONT	RACTOR	?					SPE 096		N SECTION
					TYPE O	F SUE	BMIT	TAL	1				ı	CL/ FIC/	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	PARAGRAPH NUMBER	N DESCRIPTION OF ITEM SUBMITTED	D R A W D I A N T G S	C T I O N S	S C H E D U	A T E M E		CERTIFICATES	s	RECORDS	A N U A	N F O R M A T	GOVAPROVENT	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.		e.	f. g.	h.	i.	j.	k.	l.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	w.	X.	у.	Z.	aa.
			09622	Resilient Athletic Flooring																					
			09622-2, line 16	Resilient Athletic Floor Tile	x x	X			X	X	X		X	FIO											
			09622-2, line 33	Accessories	x x	X			X	X	X		X	FIO											
							+							1											
						-	-							1											

								SI	JBN		TAL R 41				ER										NTRACT NO DACA 31-0	
TITI	LE AND I	LOC		/Lincoln Multicultural High shington, D.C.	Scho	ol &	Mi	ddle	e Scl	•			<u>, , , , , , , , , , , , , , , , , , , </u>				CONT	RACTO	₹					SPE 09 6		N SECTION
					TYI	PE OF	SUE	ВМІТТ	ΓAL	ı		1			CL FIC	ASSI- ATION			CONTRACTOR SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	I N S T R U C T I O N S	SCHEDULES	S T A T E M E Z T S	REPORTS	CERTIFICATES	SAMPLES	0	O & M M A N U A L S	N F O R M A T O	R F N F M C	E V V I D E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	w.	X.	у.	Z.	aa.
			09640	Wood Flooring-Stage									-													-
			09640-2, line 26	Solid-Wood Strip and Plank Flooring	х	X	x			X	X	X		X		G	A/E									
			09640-2, line 38	Finishing Materials	Х	X	X			X	X	X		X		G	A/E									
			09640-2, line 56	Accessory Materials	X	X	X			X	X	X		X		G	A/E									
				Shop Drawing	X	X										G	A/E									
														-												
														+										+		
														-												
														-										-		-
																								+		

								S	UBM	ITT/ (ER 4				TE	R										NTRACT NO DACA 31-0	
TITL	E AND	LOCA		Lincoln Multicultural High Schington, D.C.	cho	ol &	z Mi	iddl		-			,				CONT	RACTOF	₹						CIFICATIO 644	N SECTION
					TYF	PE OF	SUE	BMIT	TAL		1		_		CLA FICA	SSI- TION			CONTRACTO	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G ø	- N S T R U C T - O Z S	U	E M E	E	R	S II O O O O O O O O O O O O O O O O O O	R E C O R	M M A N U A L	I N F O R M A T I O N L Y	G O V A P P R P R M O V E V E D T D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j.	k. I	. n	n. r	า.	о.	p.	q.	r.	S.	t.	u.	V.	W.	x.	y.	Z.	aa.
			09644	Wood Athletic Floor Assemblies-Gym																						
			09644-2, line 66	Maple Flooring	X	X	X			х	X		>	(G	A/E									
			09644-3, line 17	Wood Subfloor System	x	X	X			х	X	:	>	(G	A/E									
			09644-3, line 29	Finishing Materials	X	X	X			х	X	7	>	(G	A/E									
			09644-3, line 42	Accessory Materials	X	X	X			X	X)	(G	A/E									
				Shop Drawings	X	X										G	A/E									
						<u> </u>																				

							SI	UBI		TAL R 41			ST	ER										CON	TRACT NO DACA 31-0	D. 00-D-0039
TITI	E AND 1	LOC	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	chool &	ž Mi	iddle	e Sc	hoc	ol						COI	NTR	ACTOR	2					SPE(N SECTION
					TYPE OI	F SUE	BMITT	TAL	1	T				C FI	LASSI- CATION			(CONTRACTO SCHEDULE DA	OR \TES		CONTRA ACTIO	CTOR ON	GOV	ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D R A W I N G S S	U C T I O	SCHEDU	STATEMENTS	R E P O R T S	CERTIFICATES	Δ	RECORDS	O & M M A N U A L S	N F O R M A T I	E R N O M	A RP EP VR I OV WE ER R	,	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f. g.	h.	i.	j.	k.	I.	m.	n.	0.	р.	q.	r.		S.	t.	u.	V.	w.	X.	y.	Z.	aa.
			09651	Resilient Floor Tile																						
			09651-2, line 25	Rubber Floor Tile	x	X				X	X		X		G	A/	E									
			09651-2, line 57	Vinyl Composition Tile	X	X				X	X		x		G	A/	E									
<u> </u>									1		1															
<u> </u>									-	-																
									+																	
									1																	
						1			1																	
						+	-	-	+	-	1															
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								S	UBMI (TTA ER 4				STE	ER										NTRACT NO DACA 31-0	
ΓΙΤL	E AND I	LOC		Lincoln Multicultural High Schington, D.C.	Scho	ol &	z Mi	ddl	e Scho	ool							CONT	RACTOR	?						CIFICATIO 653	N SECTION
					TYI	PE OF	SUE	BMIT	ΓAL		1				CLAS FICAT	SSI- TION		,	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACT	ACTOR ION	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	G S	I N S T R U C T I O N S	U L E S		C E R T I I C A T T E S S			R E C O R D S	M A N U A L S	O R M I I I I I I I I I I I I I I I I I I	GOVAEPR R P N R R V E N E D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e. Resilient Wall Base &	f.	g.	h.	i.	j. k	κ. l.	n	n. r	ո.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			09653	accessories																						
			09653-2, line 33	Resilient Wall Base	X				X	х	Х	<u> </u>	2	X	FIO											
			09653-2, line 39	Resilient Stair Accessories	X				X	X	X		3	X	FIO											
			09653-2, line 51	Resilient Accessories	X				X	X	Х	:	3	X	FIO											
										+	+	+														
											+	+														
											1															
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											\dagger															

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TITL	E AND 1	LOCA		Lincoln Multicultural High Shington, D.C.	cho	ol &	: M	iddl	e Schoo	ol						CONT	RACTOF	?					SPE 09 6		N SECTION
					TYI	PE OF	SUI	BMIT	TAL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - Z G S	- N S T R U C T - O N S	SCHEDU	S T A T E M E N T S	CERTIFICATES	s	R E C O R D S	8 N	M A N U A	I	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 09680	e.	f.	g.	h.	i.	j. k.	I.	m	. n.	. 0) .	p. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
				Carpet										\pm											
			09680-2, line 61	Tufted Carpet	X	X	X	X	X	X	X		X		G	A/E									
			09680-3, line 10	Woven Carpet	X	X	X	X	X	X	X		X	+	G	A/E									
			09680-3, line 27	Installation Accessories	X	X	X	X	X	X	X		X	<u> </u>	G	A/E									
														+											
														\perp											
							-	-		+				\dashv											
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								SI	JBMIT (E	ΓΤΑ ER 4				ГΕ	R									COI	NTRACT NO DACA 31-0). 0-D-0039
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	z Mi	ddle	Scho	ol						COI	NTRA(CTOF	२						CIFICATIO 900	N SECTION
					TYI	PE OF	SUE	ВМІТТ	AL						CLASSI- FICATION				CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T - V - T Y Z O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	- N S T R U C T - O Z S	SCHEDULES	S T A T E E P O R T T S S	CERTIFICATES	s	R E C O R D S	C & N N A N U A L S	K M M N	R	A RP EP V I EV WED R	SU	вміт	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	. I.	m	. n.	0).	p. q.	r.		S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			09900	Paint																						
			0990-4, line 28	Paint Materials	Х		X		X	X	X		X		G	A/	E									
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TTL	E AND I	LOCA		Lincoln Multicultural High hington, D.C.	Scho	ol &	. Mi	iddle	Scho	ol		•				CON	TRACTOF	?					SPE 09 9		N SECTION
					TYI	PE OF	SUE	ВМІТТ	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	ACTOR ION	GO	VERNMENT ACTION	
ACT->-FY ZO	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	-	U	S T A T F E E N F C S S	C E R T I I C C A T E S S	S	RECORDS	8 N	N A V A V	G O V E P P R O V E D F O R M A T T O N T T T T T T T T T T T T T T T T T T	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
а.	b.	C.	d. 09960	e.	f.	g.	h.	i.	j. k	i. I.	m	ı. n.	. 0).	p. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			09960	High Performance Coatings																					
			09960-4, line 10	Interior High Performance Coating Systems	X		X		х	X	X		X		G	A/E									
														1											
													-	-											

								SI	JBN		TAL R 41				ER											ITRACT NO DACA 31-0	
TITI	E AND 1	LOC		/Lincoln Multicultural High S shington, D.C.	Scho	ol &	Mi	ddle	e Scl	hoo	1		•				CON	NTR.	ACTOR							CIFICATIO 100	N SECTION
					TYF	PE OF	SUB	MITT	ΓAL	ı					CI FIC	ASSI-			S	CONTRACTO	OR TES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	- Z S T R U C T - O Z S	SCHEDULES	S T A T E M E Z F S	REPORTS	CERTIFICATES		RECORDS	O & M A N U A L S	N F O R M A	E R N M	A RP EP V ROUND EN W E E D R	Ş	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.		S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			10100	Visual Display Boards																							
			10100-3, line 4	Porcelain enamel Chalk Boards	x	X	X				х	x		x		G	A/I	E									
			10100-3, line 20	Vinyl Fabric Faced Tack Boards	X	X	X				X	X		x		G	A/I	E									
			10100-3, line 27	Metal Trim & Accessories	X	X	X				x	X		X		G	A/I	E									
			10100-3, line 59	Peg Boards	х	X	X				X	X		X		G	A/I	E									
				Shop Drawings	Х	X										G	A/I	E									
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TITI	LE AND	LOCA		Lincoln Multicultural High So hington, D.C.	cho	ol &	Mic	ddle								CONT	RACTO	२					SPE 10 1		N SECTION
					TYF	PE OF	SUB	MITTA	AL I				1	FIG	LASSI- CATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RGS	- Z S + R U C + - O Z S	SCHEDULES	S T A T E M E P O R T S	CERTIFICATES	A M P L	R E C O R D S	O & M M A N U A L S	M A T C	1 E V	V I E W E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			10155	Toilet Compartments																		1			
			10155-2, line 9	Solid – Plastic, Polymer Resin	X	X				X	X		x		G	A/E									
			10155-2, line 14	Plaster Shoes & Sleeves	X	x				x	X		X		G	A/E									
			10155-2, line 21	Full – Height (continuous) Brackets	X	X				X	X		X		G	A/E									
			10155-2, line 26	Hardware & Accessories	X	X				X	X		X		G	A/E									
			10155-2, line 31	Over Head Bracing	X	X				X	X		X		G	A/E									
			10155-2, line 34	Heat – Sink Strip for Solid Plastic Polymer – Resin Pilasters	X	X				X	X		X		G	A/E									
			10155-2, line 37	Anchors & Fasteners	X	X				X	X		x		G	A/E									
				Shop Drawing	X	X									G	A/E									

							Sl							ER											
E AND I	LOC			Scho	ol &	Mi	ddle	Sch	hoo	1						CONT	TRACTOF	?							N SECTION
				TYI	PE OF	SUB	MITT	AL						CL FIC	ASSI- ATION			CONTRACT	OR ATES		CONTRA ACTI	CTOR ON	GO	/ERNMENT ACTION	
TRANS- MITTAL NO.	I T E M N O.	PARAGRAPH NUMBER	N DESCRIPTION OF ITEM SUBMITTED	A	N G	- N S T R U C T - O N S	0 U U U U U U U U U U U U U U U U U U U	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	M A N U A	N F O R M A T O	E P R P N R M O E V	E V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
b.	C.		e.	f.	g.	h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
		10190	Cubicies																						
		10190-2, line 42	Extruded Aluminum Track	x	X					X	x		X	FIO											
		10190-2, line 53	Curtain Carriers	X	X					X	X		X	FIO											
		10190-2, line 63	Curtain Fabric	x	X					X	X		X		G	A/E									
			Shop Drawing										-		G	Δ/Ε									
			Chop Diawing										-			-VL									
													+												
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	TRANS- MITTAL NO.	TRANS- T MITTAL E NO. M	TRANS- T T SPECIFICATION PARAGRAPH NUMBER N O. b. c. d. 10190 10190-2, line 42 10190-2, line 53	TRANS-MITTAL NO. N O. DESCRIPTION OF ITEM SUBMITTED b. c. d. e. 10190 Cubicles 10190-2, Extruded Aluminum Track 10190-2, Line 42 10190-2, Curtain Carriers 10190-2, Curtain Fabric	TRANS- I T SPECIFICATION PARAGRAPH NUMBER NO. b. c. d. e. f. 10190 Cubicles 10190-2, line 42 10190-2, line 53 10190-2, line 63 Curtain Carriers x	Washington, D.C. TRANS- MITTAL NO. Description of A A A A N T G A A S b. c. d. e. f. g. 10190-2, line 42 Toll90-2, line 53 10190-2, line 63 Curtain Carriers X X Type of R A A A A A A A A A A A A A A A A A A	TRANS- T	E AND LOCATION Bell/Lincoln Multicultural High School & Middle Washington, D.C. TYPE OF SUBMITT I SPECIFICATION DESCRIPTION OF R U H A C E R U H A	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. TYPE OF SUBMITTAL TYPE OF SUBMITTAL I N S S T S T S T D R C A R U H T A C E E E W T D D I I U E A N O L N T G N E T A G S S S S S S S S S S S S S S S S S S	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. TYPE OF SUBMITTAL TRANS- I T SPECIFICATION PARAGRAPH NO. M T D M POLITIEM SUBMITTED DESCRIPTION OF ITEM SUBMITTED A N O L N R T G N E T T T A S S S S S S S S S S S S S S S S	TRANS- Trans- Trans- Trans- Trans- Trans- No. Middle School Secription of No. No	TRANS- T SPECIFICATION Multicultural High School & Middle School Washington, D.C. TYPE OF SUBMITTAL	TRANS- T SPECIFICATION DESCRIPTION OF NO. M NO. M	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	CONT CONT	CONTRACTOR CON	CONTRACTOR CON	EAND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	EAND LOCATION Bell/Lincoln Multicultural High School & Middle School CONTRACTOR CONTRACTOR Washington, D.C.	EAND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. CONTRACTOR C	EAND LOCATION Bell/Lincoln Multicultural High School & Middle School CONTRACTOR SPE 101 Security Security	EAND LOCATION Bell/Lincoln Multicultural High School & Middle School Specification Spe

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ΓΙΤL	E AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	. Mi	ddle					,			CON	TRACTOF	२						CIFICATIO 200	N SECTION
					TYF	PE OF	SUE	BMITT	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTR/ ACT	ACTOR ION	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAWINGS	I N S T R U C T I O N S	U L E S	S T A T E M E P C R T S				R = 000 000 000 000 000 000 000 000 000	M A N U A L S	I N G G F O V A A E F A N F T I N E V C N Y T D	E V I E W E E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 10200	e. Louvers & Vents	f.	g.	h.	i.	j. k	. I	. n	n. r	1. (0.	p. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			10200-3, line 1	Louvers	X	X			X	X	Х		Х	(FIO										
			,	Fixed Extruded Aluminum Wall Louvers	X	X			Х	X	Х		Х	(FIO										
			10200-4, line 29	Louver Screens	X	X			Х	X	X		Х	(FIO										
			10200-4, line 56	Blank Off Panels	X	X			Х	X	х		X	(FIO										
			10200-5, line 21	Finishes	X	X			X	X	X		×	(FIO										
				Shop Drawings	X	X									G	A/E	<u> </u>								

							Sl	JBN						ER											
E AND I	LOC			Scho	ol &	Mi	ddle	e Scl	hoo	1						CONT	RACTOR	?							N SECTION
				TYI	PE OF	SUE	BMITT	AL						CL. FIC.	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO\	/ERNMENT ACTION	
TRANS- MITTAL NO.	I T E M N O.	PARAGRAPH	N DESCRIPTION OF ITEM SUBMITTED	A T A	N G S	INSTRUCTIONS	8 C H E D D L E 8	$S + A + E \times E \times + S$	REPORTS	CERTIFICATES	SAMPLES	RECORDS	M M A N U A	N F O R M A T O I	E P R P N R M O E V	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
b.	C.		е.	f.	g.	h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	w.	X.	y.	Z.	aa.
		10265	Impact Resistant Wall																						
		10265-2, line 50	Impact resistant Wall Protection System	Х	x				X	X	X		X		G	A/E									
		10265-3, line 2	Corner Guards	X	x				X	X	X		X		G	A/E									
		10265-3, line 35	Finishes	Х	x				X	x	X		X		G	A/E									
			Shop Drawings	v											G	Λ/ E									
			Onop Drawings										1		3	7/1									
												1	-												
												1	1												
	TRANS- MITTAL NO.	TRANS- MITTAL NO. M NO.	TRANS- MITTAL NO. b. c. d. 10265-2, line 50 10265-3, line 2	TRANS- T T SPECIFICATION PARAGRAPH NUMBER DESCRIPTION OF ITEM SUBMITTED b. c. d. e. 10265 Impact Resistant Wall 10265-2, Impact resistant Wall Protection System 10265-3, Corner Guards 10265-3, Finishes	TRANS- MITTAL NO. b. c. d. 10265-2, Impact Resistant Wall Ine 50 10265-3, Impact Guards Ine 2 10265-3, Impact System Washington, D.C. TRANS- MITTAL NO. Description of A A A N T G A N T G A A S S A S S S S S S S S S S S S S S	TRANS- T	E AND LOCATION Bell/Lincoln Multicultural High School & Middle Washington, D.C. TYPE OF SUBMITT	E AND LOCATION Bell/Lincoln Multicultural High School & Middle Sci Washington, D.C. TYPE OF SUBMITTAL TYPE OF SUBMITTAL TYPE OF SUBMITTAL I N S S S T S T S T D R C A R U H T A C E E E W T D M ITEM SUBMITTED D I I U U E A N O L N T G S N E T S S S S S S S S S S S S S S S S S S	TRANS- T SPECIFICATION Multicultural High School & Middle School Washington, D.C. TYPE OF SUBMITTAL	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	TRANS- T SPECIFICATION DESCRIPTION OF NUMBER Number	TRANS- T	CER 415-1-10 E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. TYPE OF SUBMITTAL CL FIC.	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	CONT CONT	CR 415-1-10 EAND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	TRANS- TANS- TANS- TANS- TANS- TELEFORM TITEM SUBMITTED TELEFORM TELEF	EAND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. CONTRACTOR CONTRACTOR CONTRACTOR CONTRACTOR	EAND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	EAND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	CONTRACTOR SPECIFICATION Bell/Lincoln Multicultural High School & Middle School SPECIFICATION Washington, D.C. TYPE OF SUBMITTAL S R A M R P P V	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. CONTRACTOR SPECIFICATION Washington, D.C. CONTRACTOR SPECIFICATION SPEC	

								SU	BMI (RE 5-1-1		STE	R										ITRACT NO DACA 31-0	
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					TYF	PE OF	SUB	MITTA	L						CL/ FIC/	ASSI- ATION		;	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	CHEDULE	S T A T E I I I I I I I I I I I I I I I I I I	R E P	C A	SAMPLES	R E C O R	M I A I I A I A I A I A I A I A I A I A	I N F O R M A T I O N L Y	GOVERNMENT	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.		e.	f.	g.	h.	i.	j. ł	۲.	l.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			10350	Flag Poles																						
			10350-2, line 12	Flag Poles	x	x			х	()	X	x)	X	FIO											
			10350-2, line 33	Fittings	X	X			x	:)	X	x)	X	FIO											
			10350-2, line 49	Miscellaneous Materials	X	X			X	:)	X	x)	x	FIO											
			10350-2, line 58	Finishes	X	X			x	:	X	x	>	x		G	A/E									
				Shop Drawings	X	X										G	A/E									
				Structural Calculations	X											G	A/E									
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TITI	E AND	LOCA		Lincoln Multicultural High S hington, D.C.	Scho	ol &	Mic	ldle	Schoo	ol		·				CONT	RACTO	₹					SPE 104		N SECTION
					TYF	PE OF	SUBI	MITT	AL I		1	1		F	CLASSI- FICATION	-		CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAS-RG0	- N S T R U C T - O Z S	SCHEDULES	S T A T E P O R T S S	A T E	SAMPLES	RECORDS	O & M M A N U A L S	N F O R M A T	G O V A E P N R P N R C N L Y T D	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 10425	e. Signs	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	p	. q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			10420	Orgino																					
			10425-3, line 48	Panel Signs	X	X		X		X	X		X		G	A/E									
			10425-4, line 19	Dimensional Letters & Numbers	X	X		X		X	X		X		G	A/E									
			10425-4, line 31	Cast Metal Plaque	X	x		X		X	X		X		G	A/E									
			10425-4, line 43	Dedication Plaques	X	X		X		X	X		X		G	A/E									
				Interior Room Identification Signs	X	X		x		X	X		X		G	A/E									
				Exterior Building Identification Signage	X	X		X		X	X		X		G	A/E									
			10425-5, line 17	Finishes	X	Х		X		X	X		X		G	A/E									
				Shop Drawings	Х	х									G	A/E									-

								Sl	JBMI7 (E			REG 1-10		ΤE	R									NTRACT NC DACA 31-0	
TITI	LE AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	z Mi	ddle				,	,			CONT	RACTOF	२					SPE 10		N SECTION
					TYI	PE OF	SUE	ВМІТТ	AL						CLASSI- FICATION	_		CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR AW INGS	- N S T R U C T - O N S	SCHEDULES	S T A T E M E P O R T S	C	S A M P	(E	8 N A A A A A A A A A A A A A A A A A A	M A V J	I	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 10505	e. Metal Lockers	f.	g.	h.	i.	j. k.	. I.	m	n. n	. с).	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			10303	Wetai Lockers																					
			10505-2, line 38	Ward Robe Lockers	X	X			x	X	x		x		G	A/E									
			10505-3, line 22	Athletic Lockers	X	x			x	x	X		X		G	A/E									
			10505-4, line 7	Locks	X	X			x	X	X		X		G	A/E									
			10505-4, line 17	Locker Accessories	X	X			X	X	X		X		G	A/E									
			10505-4, line 41	Locker Benches	X	X			x		X		X		G	A/E									
			10505-5 line 25	Steel Sheet Finishes	X	X			X	X	X		X		G	A/E									
			10505-5, line 38	Finishes					Х	x	X		X		G	A/E									
				Shop Drawings	X	X									G	A/E									

								SU	BMI	ΓΤΑ ER 4				ER	?										NTRACT NO DACA 31-0	
TITI	E AND	LOCA		Lincoln Multicultural High Schington, D.C.	Scho	ol &	Mi	ddle				-,				С	ONT	RACTOR	?						CIFICATION 520	N SECTION
					TYF	PE OF	SUB	MITTA	AL I		1				CLASSI- FICATION	١			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	I N S T R U C T I O N S	SCHEDULES	S T A T E E M P E O N R T T S S	I C A T E S	S A M P L E S	E C O R D S	L S	N F O R M A T I O N	V E R N O M N E	A P P R O V E D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 10520	e. Fire Protection	f.	g.	h.	i.	j. k.	. I.	m	. n.	0.		p. q		r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
				Specialties																						
			•	Portable Fire Extinguishers	x		x		х	X			x		G	,	A/E									
			10520-2, line 56	Portable Fire Blankets	X		X		X	X			X		G	; ,	A/E									
			,	Fire – Protection Cabinets	x		X		X	X			X		G	,	A/E									
			10520-3, line 56	Accessories	X		X		х	X			X		G	,	A/E									
			line 15	Fire Dept. Lock boxes	х		X		X	X			x		G		A/E									
			10520-4, line 23	Colors & Textures	X		X		X	X			X		G	• /	A/E									
			10520-4, line 47	Steel Finishes	X		X		Х	X			X		G	,	A/E									

								SL	JBMIT (E			EG -10)		ER										NTRACT NO DACA 31-0	
ΓITL	E AND I	LOCA		Lincoln Multicultural High Shington, D.C.	Scho	ol &	Mi	ddle				,				CONT	RACTOF	₹						CIFICATIO	N SECTION
					TYI	PE OF	SUB	MITT	AL			1		FI	LASSI- CATION			CONTRACTO	OR ATES		CONTR/ ACT	ACTOR ION	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A S - Z G S	I N S T R U C T I O N S	\circ C H \sqcup D U \sqcup \sqcup \circ	S T A T E P P O R T S	CERTIFICATES	SA	R E C O R D S	O & M A N U A L S	N F O R M A T I	G O A E P R P N R O N E V N E D T D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j. k.	I.	m	. n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			10652	Folding Panel Partition																					
			10652-3, line 13	Panel Construction	X	X			х	X	X		X		G	A/E									
			10652-3, line 33	Suspension System	X	X			X	X	X		X		G	A/E									
			10652-3, line 43	Finish Surface	X	x			X	X	X		X		G	A/E									
			10652-4, line 1	Electrical Operators	X	x			X	X	X		X		G	A/E									
			10652-4, line 24	Posts and Seals	X	X			X	X	X		X		G	A/E									
			10652-4, line 45	Options	X	X			X	X	X		X		G	A/E									
				Shop Drawings	X	X				+	+				G	A/E									

							SU						EF	₹										
E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle				-,				CONT	TRACTOF	२							N SECTION
				TYF	E OF	SUB	MITTA	AL I						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	S C H E D U L E S	S T A T E E P O R T T S S	T		R E C O R D S	M A N U A	N F O R M A T	O V A E P N R P N R N R N R N R N R N R N R N R	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
b.	c.	d.	e.	f.	g.	h.	i.	j. k.	I.	m	. n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
		10675	Metal Storage Shelving	-						-		-												
		10675-2, line 44	Open Shelving	x	x			X	x	x		x	X											
		•	Finishes	x	x			X	X	X		x	X	(
			Shop Drowings	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \										A /E									
			Shop Drawings	X	X									G	A/E									
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				-																				
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	TRANS- MITTAL NO.	TRANS- MITTAL NO. M NO.	TRANS- I T SPECIFICATION PARAGRAPH NUMBER No. N O. d. b. c. d. 10675- 10675-2, line 44 10675-3, line 2	TRANS-MITTAL NO. DESCRIPTION OF ITEM SUBMITTED b. c. d. e. 10675 Metal Storage Shelving 10675-2, line 44 10675-3, Finishes	TRANS- MITTAL NO. Description of Item Submitted No. A T A T A T A T A T A T A T A T A T A	Washington, D.C. TRANS- I SPECIFICATION PARAGRAPH NO. M NUMBER NO. DESCRIPTION OF ITEM SUBMITTED DESCRIPTION OF A NOT GAY NOT	Washington, D.C. TRANS- MITTAL NO. DESCRIPTION OF NUMBER NO. DESCRIPTION OF ITEM SUBMITTED NO. DESCRIPTION OF ITEM SUBMITTED NO. DESCRIPTION OF NUMBER NO. DESCRIPTION OF NUMBER NO. T G N N A S S N A	TRANS- T SPECIFICATION MURICULTURAL High School & Middle Washington, D.C. TRANS- T SPECIFICATION DESCRIPTION OF NUMBER NO. N O. L T G N E A S S S S S S S S S S S S S S S S S S	E AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. TYPE OF SUBMITTAL I SPECIFICATION PARAGRAPH NO. MITTAL E NUMBER NO. DESCRIPTION OF ITEM SUBMITTED DESCRIPTION OF A C E E E E E E E E E E E E E E E E E E	CER 4 LE AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	CER 415-1 LE AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	CER 415-1-10 LE AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	CER 415-1-10 CEAND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	CER 415-1-10 EAND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	TRANS- T SPECIFICATION DESCRIPTION OF NUMBER Number	CONT CONT	CONTRACTOR Sell/Lincoln Multicultural High School & Middle School Washington, D.C.	CONTRACTOR CON	CONTRACTOR CON	CONTRACTOR CON	CONTRACTOR CON	CONTRACTOR CON	CONTRACTOR SPECIFICATION Bell/Lincoln Multicultural High School & Middle School Mashington, D.C. SPECIFICATION SPECIFICATION DESCRIPTION OF NO. N. O. O	ER 415-1-10 DACA 31-0 SPECIFICATION Washington, D.C. CONTRACTOR SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SPECIFICATION SCHEDULE DATES SUBMIT TO SCHEDULE DATE SUBMIT TO SCHEDULE DATES SUBMIT TO SCHEDULE DATES

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TITI	E AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle								COI	NTF	RACTOR	R					SPE 108		N SECTION
					TYF	PE OF	SUB	MITT	AL					F	CLASSI- FICATION			;	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	I N S T R U C T I O N S	SCHEDULES	S T A T E M P O R T S	C E R T I F I C A T E S	SAM	R E C O R D S	O & M M A N U A L S	N F O R M A T I	G O V A E F R N R O N L V T C	E	, , ,	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 10800	e. Toilet & Bath	f.	g.	h.	i.	j. k.	I.	m	. n.	0.	. p	o. q.	r.		S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			10000	Accessories																						
			10800-2, line 67	Electric Hand Dryer	X	X		X		X	X		X	FI	0											
			10800-3, line 13	Combination Towel Dispenser / Waste Receptacle Unit	X	X		X		X	X		X	FI	0											
			10800-3, line 22	Paper Towel Dispenser	X	X		X		X	X		X	FI	0											
			10800-3, line 30	Toilet Tissue Dispenser	X	x		X		X	X		X	FI	0											
			10800-3, line 37	Grab bars	X	X		X		X	X		X	FI	0											
				Sanitary Napkin Vendors	x	X		X		X	X		X	FI	0											

		1						1			1	T T	1		1	
	10800-4,	Sanitary Napkin Disposal units	X X	. X	(X	X		X	FIO						
	line 7	Disposal units														
		•														
	10800-4,	Soap Dispenser	хх	×	,	х	v		_	FIO						
	10000-4,	Soap Disperiser		·	`	^	^		^	FIO						
	line 15															
	10800-4,	Folding Shower Seat	x x	X	(X	X		X	FIO						
	line 35															
	10000 4	Shower & Bath	- V		,		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		\	FIO						
	10800-4,		x x	. X	`	X	X		X	FIO						
	line 52	Accessories														
	10800-4,	Miscellaneous	хх	X		Х	X		X	FIO						
	line 64	Accessories														
		7.000000.100														
	40000 F	BASSON OF LINES			_				<u> </u>	FIG						
	10800-5,	Mirror Units	x x	 	(X	X		X	FIO						
	line 21															
	+															
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 								1		+ +						
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TITL	E AND 1	LOC	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	chool	& M	iddl	e Sc	hoo	ol						CONT	RACTOF	3					108		N SECTION
					TYPE (OF SUI	BMIT	TAL						CL FIC	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GOV A	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A N A S	R UCT IONS	S C H E D U L E S	E M E N T S	R E P O R T S	CERTIFICATES	Δ	RECORDS	O & M M A N U A L S	N F O R M A T I	E V	V I E W E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f. g	. h.	i.	j.	k.	l.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			10802	Diaper Changing Station																					
			10802-1, line 17	Adult Diaper Changing Stations	хх	х				x	X		X	FIO											
															1										
					1									-											
															+										
										-		_			1										
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TITL	E AND I	LOC	ATION Bell/ Was	Lincoln Multicultural High Schington, D.C.	Schoo	ol &	Mi	ddle S					-,				CONT	RACTOF	२					SPE0 110		N SECTION
					TYP	E OF	SUB	MITTAI	L						CL/ FIC/	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GOV A	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A S – Z G S	I N S T R U C T I O N S		S T A T I I E I I I I I I I I I I I I I I I I	R	CERTIFICATES	S A M P L E S	R E C O R	M A N U A	I N F O R M A T I O N	E V	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j. ł	۲.	l. r	m. r	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			11026	Safes					-																	
			11026-2, line 10	Wall Safe	Х	X			х	X	()	K	FIO											
			11026-2, line 11	Floor Safe	X	x			Х	: X	(,	K	FIO											
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ΓΙΤL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High Schington, D.C.	Scho	ol &	Mi	iddl	e Scho	ol						CON	TRACTOF	?						CIFICATIO 063	N SECTION
					TY	PE O	F SUE	BMIT	ΓAL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	ACTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G S	C T I O N S	U L E S			S A M P L E S		M A N L A L	M	I	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. I.	m	ı. n.	. 0).	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			11063	Performance Rigging Systems																					
				Stage, Black Box & TV Studio Curtains	x	X	x		x	X			X		FIO										
			11063-2, line 44	Stage, Black Box & TV Studio – Curtain Suspension Systems, Grids & other Battens	X	x	X		X	X			x		FIO										
				Shop Drawings	Х	Х									G	A/E									
														1											
							1	1																	

							SI	UBN		TAL R 41			STE	ER										ITRACT NO DACA 31-0	
TITI	E AND I	LOC		l/Lincoln Multicultural High ashington, D.C.	School &	ż Mi	ddle	e Scl	hoo	1						CONT	RACTOR	2					SPE 111		N SECTION
					TYPE OF	F SUE	BMITT	ΓAL		1 1				CLA FICA	ASSI- ATION		:	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO\	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	PARAGRAPH NUMBER	N DESCRIPTION OF ITEM SUBMITTED	D R A W I N G S	- N S T R U C T - O Z S	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	SAMPLES	RECORDS	M M	- N F O R M A T - O N	<pre>GO>ERZSEZF</pre>	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.		e.	f. g.	h.	i.	j.	k.	l.	m.	n.	0.	p.	q.	r.	S.	t.	u.	٧.	W.	X.	у.	Z.	aa.
			11110	Commercial Laundry Equipment																					
			11110-1, line 50	Washer	x	X				X	X		X	FIO											
			11110-1, line 52	Dryer	x	X				x	X		X	FIO											
																									1

								Sl	JBMIT (E	TA R 4				ER											NTRACT NC DACA 31-0	
TITI	E AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	. Mi	ddle								(CONT	RACTOF	₹						CIFICATION 132	N SECTION
					TYF	PE OF	SUE	BMITT	AL					F	CLASSI FICATIO	I- DN			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAWINGS	I N S T R U C T I O N S	8 C H H D D L H 8	S T A T E M P O R T S	C E R T I F I C A T E S	S A M	R E C O R D S	O & M M A N U A L S	N F O R M A T I	G O V E R N M E N T T	A P P R	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 11132	e. Projection Screens	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	r). C	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			11102	Trojection corcens																						
				Manually Operated Screens	X	X	X			X	X		X	FI	10											
				Electrically Operated Screens	X	X	X			X	X		X	FI	Ю											
				Electrically Operated Screens with Automatic Ceiling Closure	X	X	X			X	X		X	F	Ю											
			1132-3, line 3	Electrically Operated Screens with Out Ceiling Closure	X	X	X			X	X		X	F	Ю											
				Shop Drawings	X	X									(G	A/E									
														+									1			
																										

								S	UBMI (REG 1-10)		ΤE	R									ITRACT NO DACA 31-0	
TITL	E AND I	LOC		Lincoln Multicultural High shington, D.C.	Scho	ol &	z Mi	iddle	e Scho	ol						CONT	RACTOF	?						CIFICATIO 133	N SECTION
					TYI	PE OF	F SUE	BMIT	ΓAL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	ACTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y NO	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR AW INGS	C T I	H E D U	S T A T F E E M F F S S S	C E R T I F C A T E S S	s	RECORDS	8 N	M	I N G G O V A E P M R R O M O L N E D N E D N	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	i. I.	m	. n.	0).	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			11133	Television Monitor Mount																					
			11133-1, line 63	Monitor Mount	х		x			x			X		G	A/E									
			11133-2, line 6	VCR Bracket	x		X			X			X		G	A/E									
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TITI	E AND	LOCA		Lincoln Multicultural High Shington, D.C.	cho	ol &	Mi	ddl				,				CON	TRACTO	R						CIFICATION 136	N SECTION
					TYF	PE OF	SUE	BMIT	TAL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RG%	- N S T R U C T - O N S	SCHEDULES	S T A T E M E N T S	I C A T E	S A M P L	E C	8 N N N	M	I	P V V I I I I I I I I I I I I I I I I I	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	l.	m	. n.	o).	p. q.	r.	S.	t.	u.	V.	W.	x.	y.	z.	aa.
			11136	Language Laboratory Equipment																					
			11136-3, line 9	Instructors Control Panel	X	X	X	X	X	X			X		G	A/E									
			11136-4, line 28	Instructors Console	X	X	X	X	x	x			X		G	A/E									
			11136-5, line 4	Program Cassette Tape Recorders	X	X	X	X	x	x			X		G	A/E									
			11136-5, line 50	Instructors Headphones / Microphones	X	X	X	X	x	X			X		G	A/E									
			line 28	Student Overhead Tray System	X	X	X	X	X	X			X		G	A/E									
			11136-7, line 6	Student Amplifiers	X	X	X	X	X	X			X		G	A/E									
			11136-7,	Student Headphones / Microphone	X	X	X	X	x	x			x		G	A/E									

								SI	JBN				EG (-10)		ER											TRACT NO DACA 31-0	D. 00-D-0039
TITL	E AND I	LOC	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	Scho	ol &	. Mi	ddle	e Sc				,					CONT	RACTOF	3					SPE0		N SECTION
					TYI	PE OF	SUE	ВМІТТ	TAL	1					FI	CATI	SSI- TON			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GOV A	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	INSTRUCTIONS	S C H E D U	STATEMENTS	R E P O R T S	CERTIFICATES	s	R E C O R D S	O & M A N U A L S	N F O R M A T I	ON L Y	G O V E R N M E N T	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	е.	f.	g.	h.	i.	j.	k.	I.	m	. n.	0.	р		q.	r.	S.	t.	u.	V.	w.	X.	y.	Z.	aa.
			11150	Parking Control																							
			11150-2, line 41	Access Control Units	x	X	X				X			X			G	A/E									
			11150-2, line 55	Finishes	X	X	X				X			X			G	A/E									
							<u> </u>	<u> </u>						-													
							-	-																			

								SL					EG -10)		ΓEF	₹									CON	TRACT NO DACA 31-0	D. 00-D-0039
TITL	E AND 1	LOC	ATION Bell/ Was	Lincoln Multicultural High Schington, D.C.	Schoo	ol &	Mie	ddle	Scł	hoo	ol							CONT	RACTOR	8					SPE(N SECTION
					TYPE	E OF	SUB	MITT	٩L					1		CLA	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRAC ACTIO	CTOR ON	GOV A	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A S − Z G Ø	- Z ∅ + R J C + - O Z ∅	SCHEDULES	STATEMENTS	REPORTS	CERTIFICATES	S	R E C O R D S	O & M M A N U A L S	M F C M F M M M M M M M M M M M M M M M	7 7 8 4 1	GOVERNMENT	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j.	k.	I.	m.	. n.	0		p.	q.	r.	S.	t.	u.	V.	w.	X.	y.	Z.	aa.
				Loading Dock Equipment																							
			11160-2, line 10	Dock Bumpers	X	Х					X	x		X	F	FIO											
														1													
											-			1													
															-												
											-			-	+												
												L		l													

								SU	BMIT (E	TAI R 41			STE	ΞR										ITRACT NO DACA 31-0	
TITL	E AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle				,				CONT	TRACTO	२					SPE 11 1		N SECTION
					TYF	PE OF	SUB	MITTA	AL I			1		CI FIC	LASSI- CATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RG0	I N S T R U C T I O N S	SCHEDULES	S T A T E E P O R T T S	I C A T E	S A M P L E S	RECORDS	O & M M A N U A L S	I N F O R M A T I N N N	N E V	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	x.	y.	Z.	aa.
			11194	Salon Furnishings																					
			11194-2, line 22	Wall Mounted Styling Station	X	X				X			X		G	A/E									
			11194-2, line 23	Shampoo Chairs	X	X				X			X		G	A/E									
			11194-2, line 24	Dryer Chairs & Dryers	X	X				X			X		G	A/E									
			11194-2, line 26	Reception Desk	X	X				X			X		G	A/E									
			line 27	Hydraulic Styling Chair	X	X				X			X		G	A/E									
			11194-2, line 28	Pedicure Spas	X	X				X			X		G	A/E									I
				Shampoo Wall Units	х	X				X			X		G	A/E									

								SUE				REG 1-10)		TER	?									CON	TRACT NO DACA 31-0	O. 00-D-0039
TITL	E AND I	LOC	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	School	1 & 1	Mid	dle S	Scho	ool		-					CONT	RACTOF	8					SPEC 114		N SECTION
					TYPE	OF S	SUBN	/ITTAL	-						CLA FICA	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GOV A	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED		DRAW-NGS	R U C T I O N S	C H T E E E D M U E S S S					& N N A N U A L S	J T A I O S N	O N L Y	4 P P R O > U D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i. j	. k	i. I.	. m	n. n.	0).	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			11400	Kitchen Equipment																						
			1.05	Kitchen Equipment	x	,	,				Х		Х			G	A/E									
			1.03	Kitchen Equipment	^	<u>^ /</u>	`				^		^				~_									
				ANSL	X X	x >	(х		Х			G	A/E									
							_				Ť		1				14-									
							İ																			

								SU	BMIT (E	TAL R 41			STE	ER										NTRACT NO DACA 31-0	
TITI	LE AND	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle								CONT	RACTOF	₹					SPE 114		N SECTION
					TYF	PE OF	SUB	MITTA	AL .					CL/ FIC/	ASSI- ATION			CONTRACTO	OR ATES		CONTRA ACTI			VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.		SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR A W - N G S	I N S T R U C T I O N S	SCHEDULES	S T A T E E M E P O R T S	I C A T E S	8 A M P L E 8	RECORDS	ANUALS	N F O R M A T O N L Y	E V	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 11451	e. Residential Appliances	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			11731	Residential Appliances																		1			l
			11451-2, line 36	Electric Range	X		X			X			X		G	A/E									
				Combination Microwave Oven / Range Exhaust Hood	X		X			X			X		G	A/E									
			11451-2, line 42	Clothes Washer	X		X			X			X		G	A/E									
			11451-2, line 45	Electric Clothes Dryer	X		X			X			X		G	A/E									
			line 50	Dish Washer	X		X			X			X			A/E									
			11451-2, line 53	Food Waste Disposer	X		X			X			X		G	A/E									
			11451-2,	Top-Mount Refrigerator Freezer	Х		X			X			X		G	A/E									

								SI	JBMI7 (E	ΓΤΑΙ ER 41			ST	ER										NTRACT NC DACA 31-0	
TITI	E AND	LOC		Lincoln Multicultural High Shington, D.C.	Scho	ol &	z Mi	ddle				,				CON	TRACTO	R						CIFICATION 184	N SECTION
					TYI	PE OF	SUE	ВМІТТ	AL			1		(F	CLASSI- ICATION			CONTRACTOR SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	- NSTRUCT-ORS	SCHEDULES	S T A T E M P O R T S	I C A T E	SAMPLES	RECORDS	O & M M A N U A L S	N F O R M A T I	R N O M N E L N	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j. k.	l.	m.	n.	0.	p.	. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			11484	Basket Ball Back Stops	_																				
			11484-1, line 51	Back stops, forward Fold	X	X	X			X			X		G	A/E									
			11484-2, line 1	Frame	X	X	X			x			X		G	A/E									
			11484-2, line 3	Motors & Winches	X	X	X			x			X		G	A/E									
			11484-2, line 5	Motor Switches	X	X	X			x			X		G	A/E									
			11484-2, line 7	Safety Lock	X	X	X			X			X		G	A/E									
			11484-2, line 9	Back Board Height Adjuster	X	X	X			X			X		G	A/E									
			11484-2, line 11	Back Board (clear)	X	X	X			X			X		G	A/E									
				Back Board (Opaque)	X	X	X			X			X		G	A/E									
				Goal	X	X	X			X			X		G	A/E									
				Shop Drawing	Х	Х									G	A/E									

								SI	JBMI7 (E	ΓΤΑ ER 4				ER	?										NTRACT NC DACA 31-0	
TIT	E AND	LOCA		Lincoln Multicultural High Son hington, D.C.	cho	ol &	z Mi	ddle				,				CON	NTF	RACTOR	2					SPE 114		N SECTION
					TYF	PE OF	SUE	ВМІТТ	AL						CLASSI- FICATION			5	CONTRACTO	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RG%	- N S T R U C T - O N S	SCHEDULES	S T A T E M E P O O R T S	C	S A M P L	E C O	O & M M A N U A L S	N F O R M A T I	O V E R R N M E N E N E N E	A RP EP V I O E W E D R	,	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	СООЕ	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 11490	e. Athletic Equipment	f.	g.	h.	i.	j. k.	. l.	m	. n.	0.		p. q.	r.		S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			11430	Atmetic Equipment																						
			11490-2, line 15	Volley Ball Equipment	X	X	X			X	X		X		G	A/I	E									
			11490-2, line 38	Tennis Equipment	X	X	x			X	X		X		G	A/I	E									
			11490-2, line 51	Wind Screen	X	X	X			X	X		X		G	A/I	E									
			11490-2, line 55	Protective Wall Padding	X	X	X			X	X		X		G	A/I	E									
				Wall Attached Horizontal Bar	X	X	X			X	X		X		G	A/I	E									
				Shop Drawings	X	X									G	A/I	E									
						-																				
						\vdash				+							+									

							SU			AL R 415-1			ER											TRACT NO DACA 31-0	O. 00-D-0039
TITI	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	chool &	z Mi	ddle S				- /					CONT	RACTOF	₹					SPE0 116		N SECTION
					TYPE OI	SUE	MITTA	L					(F	CLASS ICATIO	SI- ON			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GOV A	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	DR AWINGS	C T I			F	CERTI SAMPLES	R E C O R D S	O & M A N U A L S	N F O R M A T I	GOVERN MENT	A P P R O V E D	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f. g.	h.	i.	j. k	(. l	l. m	. n.	0.	р.	. (q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			11610	Laboratory Fume Hoods																					
			11610-4, line 1	By Pass Fume Hoods	хх			X	X	X		x		(G	A/E									
		_																							
										+															
										\perp															
																									<u> </u>

								S	UBI				EG -10)		ΈR											TRACT NO DACA 31-0	O. 00-D-0039
TITL	E AND 1	LOC		Lincoln Multicultural High S hington, D.C.	cho	ol &	z Mi	iddl	e Sc				,					CONT	RACTOR	?					SPEC 116		ON SECTION
					TY	PE OF	FSUE	BMIT	TAL		,			ı	(F	CLAS	SSI- TON		;	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GOV A	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	G	UCTIONS	SCHEDULES	T E M E N T S	R E P O R T S		S A M P L E S			N F O R M A T I O N	N I I I Y	GOVERNOVED	R E > - E > E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.		. g.	h.	i.	j.	k.	I.	m	. n.	0.	. р		q.	r.	S.	t.	u.	٧.	W.	X.	y.	Z.	aa.
			11620	Audio Visual Equipment		_	\bot																				
				Video Environe	-			<u> </u>									•	A /F									
				Video Equipment	X	X	 X	X	X	X	X	X		X			G	A/E									
				Audio Equipment	X	х	X	X	X	X	X	Х		Х			G	A/E									
				Remote Control Equipment	X	X	X	X	X	X	X	X		X			G	A/E									
				Floor Boxes/Wall Plates	~			~	X	~	X			X			G	A/E									
				FIOUI DUXES/VVAII FIALES	X	_	+	^	X	X	^	Α		X			G	AVE									
				Equipment Racks and Miscellaneous	X	X	x	х	X	x	x	X		X			G	A/E									
				Shop Drawings	X	X	 										G	A/E									
						+	+		-	-	-	-		-	-												
						+	+	-		-	1			-													
						+	+			+				1	+	+											
						+	+	1			1																+
<u> </u>			1							1												l					

								Sl	JBM		ΓAL R 41			STE	ER										ITRACT NO DACA 31-0	
TIT	LE AND	LOC		/Lincoln Multicultural High S shington, D.C.	Scho	ol &	Mi	ddle					,				CONT	RACTOR	R						CIFICATIO 804	N SECTION
					TYF	PE OF	SUB	MITT	AL						CL <i>A</i> FIC <i>A</i>	ASSI- ATION		(CONTRACTO	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O	SPECIFICATION PARAGRAPH NUMBER	N DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	I N S T R U C T I O N S	SCHEDULES	S T A T E M E N T S	REPORTS	CERTIFICATES	SAMPLES	R E C O R D S	A N U A	I N F O R M A T I O N	GOVERNMENT	R E V – E & E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.		e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			12304	Plastic Laminate Faced Casework																						
			12304-2, line 16	Plastic Laminate Faced Casework	X	X					X	Х		X		G	A/E									
			12304-3, line 13	Hardware & Accessories	X	X					X	X		X		G	A/E									
			12304-3, line 54	Tops & Accessories	X	X					X	X		X		G	A/E									
				Shop Drawings	Х	X										G	A/E									
		-							+																	
		+																								

								SUI				RE0 -1-10		STE	R									CON	TRACT NO DACA 31-0	D. 00-D-0039
TITI	E AND 1	LOC	ATION Bell/ Was	Lincoln Multicultural High Shington, D.C.	choo	1 & 1	Mic	ldle S	Scho	ool							CONT	RACTOF	?					123		N SECTION
					TYPE	OF S	SUBN	MITTAI	L						CL FIC	ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GOV	ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W	R U C T I		STATEMENTS	R	CERTIFICATES	SAMPLES	R E C O R	M A N U A	I N F O R M A T I O N Y	I E V	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.		g.	h.	i. j	j. l	k.	l. r	m. r	n.	0.	p.	q.	r.	S.	t.	u.	V.	w.	x.	y.	Z.	aa.
			12326	Music Storage Cabinets																						
				Music Instrument Storage Cabinets	X	x				х	×	(,	X		G	A/E									
				Shop Drawings	X	X										G	A/E									
												_														
							-				+	+	\perp													
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TITI	E AND	LOCA		Lincoln Multicultural High hington, D.C.	Scho	ol &	z Mi	ddle								CONT	RACTOF	₹					SPE 123		N SECTION
					TY	PE OF	SUE	ВМІТТ	AL		1				CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	- N S T R U C T - O N S	SCHEDULES	S T A T E M P C R T S	C E R T I F I C A T E S	SAM	R E C O R D S	A N	N	F	V I E W	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 12345	e. Laboratory Casework	f.	g.	h.	i.	j. k	. I.	m	. n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			12343	and Fixtures																					
			12345-3, line 29	Wood Laboratory Casework	х	x				X	X		X		G	A/E									
			12345-4, line 39	Hardware and Accessories	x	x				X	X		X		G	A/E									
			12345-5, line 14	Tops & Accessories	x	X				X	X		X		G	A/E									
			12345-6, line 41	Sinks	X	X				X	X		X		G	A/E									
				Mechanical Service Fixtures	x	X				x	X		X		G	A/E									
			12345-7,	Electrical Service Fixtures	x	X				x	X		X		G	A/E									
			12345-8, line 2	Accessories	x	X				X	х		X		G	A/E									
				Shop Drawings	X	x									G	A/E									

								SUE	3MI)	ITT/ (ER -	AL F 415-	REG 1-10)	IST	ER										CON	TRACT NO DACA 31-0	D. 0-D-0039
TITI	E AND I	LOC	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Schoo	1 & N	Mid	dle S	Scho	ool							CONT	RACTOF	?					SPE(124		N SECTION
					TYPE	OF S	UBN	/ITTAL	-						CLAS	SSI- FION			CONTRACT	OR ATES		CONTRA ACTIO	CTOR ON	GOV	ERNMENT CTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W	R U C T	S C A T E E E D M U E S S S	6 T	R I		S R E C O R D S	O & M M A N U A L S	N F O R M A T I	O N L Y	GO V E R R R O V E D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g. I	h.	i. j	. I	k.	l. m	n. n.	0.	. r	o	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			12494	Roller Shades	+++																					
			12494-2, line 53	Roller Shades	Х	x	2	K	х	X	X		x	F	Ю											
				Shop Drawings	х	X										G	A/E									
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								SL	JBN		TAL R 41				ER										TRACT NO DACA 31-0	O. 00-D-0039
TITL	E AND I	LOC	ATION Bell/ Was	Lincoln Multicultural High a chington, D.C.	Schoo	ol &	Mi	ddle	Scł								CON	TRACTO	R					SPE0 126		N SECTION
					TYP	E OF	SUE	MITT	AL		1		ı		Cl FIC	ASSI-			CONTRACT SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GOV	ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	SCHEDULES	STATEMENTS	R E P O R T S	CERTIFICATES	S A M P L E S	R E C O R D S	O&M MANUALS	N F O R M A T I	E F R F N F	R E V I E W E E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j.	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			12690	Floor Mats & Frames															1							
			12690-2, line 7	Mat	X	X	X				X	X		X		G	A/E									
			12690-2, line 27	Recessed Frame	x	X	X				X	X		X		G	A/E									

								SL	JBMIT (E	ΓΤΑ ER 4				ΤE	R										NTRACT NC DACA 31-0	
TITI	E AND	LOCA		Lincoln Multicultural High hington, D.C.	Scho	ol &	Mi	ddle				·					CONT	RACTOF	₹					SPE 127		N SECTION
					TYI	PE OF	SUE	BMITT.	AL T						CLASS	SI- ON			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S	INSTRUCT-ONS.	SCHEDULES .	S T A T E M E N T S .	I C A T E S	S A M P L E S	E C O R D S	8 N A A N L S	M A V J A L S	I N G G O V R E M R N T O M E N Y T O L N Y T	P P R O V I E D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
а.	b.	C.	12710	e. Auditorium & Theater Seating	f.	g.	h.	i.	j. k.	. I.	m	i. n.	. C). 	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			12710-3, line 52	Metal Standards	X	X			X	x	X		X			G	A/E									
			12710-3, line 63	Upholstered Chairs	X	x			Х	x	X		X			G	A/E									
			12710-4, line 40	Accessories	X	x			х	X	X		X			G	A/E									
			12710-4, line 44	Metal Finishes	X	x			х	X	X		X			G	A/E									
				Shop Drawings	X	X										G	A/E									

								SI	UBMI	TTA ER 4				TE	R									ITRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High Solington, D.C.	cho	ol &	z Mi	iddle					<i>,</i>			CONT	RACTOF	₹						CIFICATIO 760	N SECTION
					TYF	PE OF	SUE	ВМІТТ	ΓAL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON		VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S	- N S T R U C T - O R S	U L E	S T A T I E I M I E N T S S	C E R T I I C C A T T E S S	: 5	6 R M C R E E S		M A V J A	I	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j. ŀ	t. I.	. m	n. n	. 0).	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			12760	Telescoping Stands																					
			12760-3, line 18	Bench Seats & Skirts	X	X				X	X		Х		G	A/E									
			12760-3, line 31	Risers	X	X				X	X		X		G	A/E									
			12760-3, line 33	Foot Rests	X	X				x	X		Х		G	A/E									
			12760-3, line 35	Under Structure	X	X				X	X		X		G	A/E									
			12760-3, line 40	Support Column Wheels	X	X				X	X		X		G	A/E									
			line 45	Aisles	X	X				X	X		X		G	A/E									
			12760-3, line 52	Row Spacing	X	X				X	X		X		G	A/E									

12760-3, line 54	Row Rise	x x	x	X	X	G	A/E				
12760-3, line 59	Operation	x x	x	X	X	G	A/E				
							L				
12760-4, line 11	Accessories	X X	X	X	X	G	A/E				
12760-4, line 20	Steel Finishes	x x	X	X	X	G	A/E				
	Shop Drawings	X X				G	A/E				
 1 1										1	

								SI	JBMI7			REG I-10)		ΓΕΙ	R										TRACT NO DACA 31-0	
TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	z Mi	ddle	Scho	ol							CONT	RACTOR	?						CIFICATIO 3100	N SECTION
					TYI	PE OF	SUE	ВМІТТ	AL				1		CLASS	SI- ON			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	ACTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	G	- N S T R U C T - O N S	SCHEDULES	S T A T E M E P O R T S	CERTICATES	s	R E C O R D S	O & M M A N U A L S	1 N N N N N N N N N	I N G C C C C C C C C C C C C C C C C C C	/ A E P R P N R	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d. 1.3	e. Lightning Protection	f.		h.	i.	j. k.	. I.	m	. n.	0.			q. G	r. A/E	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			1.3	Lightning Protection		^			^	^						G	A/E									
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TITI	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	Mi	ddle	Schoo	ol						CON	TRACTO	R						CIFICATIO 3810	N SECTION
					TYI	PE OF	SUB	MITT	AL	1		1	1	F	CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	ACTOR ION	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	SCHEDULES	S T A T R E E M P E O N R T T S S	CERTIFICATES		RECORDS	O & M M A N U A L S	N F O R M A T	V A E F R F	E V V I I E W W E E E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.	d. 1.4	e. Clock System	f.	g. X	h.	i.	j. k.		m.	n.	о. X	р	o. q. G	r. A/E	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			11-7	Olock Oystelli							^		_			- A/L									
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TITL	E AND 1	LOCA	ATION Bell/	Lincoln Multicultural High hington, D.C.	Scho	ol &	z Mi	ddle	Schoo	ol		-				CONT	TRACTOF	?					SPE	CIFICATIO	N SECTION
		ı	vv as	imigion, D.C.	ITV	DE OF	CLID	MITTA	1						CLASSI-		1	CONTRACTO	AP.		CONTRA	CTOP		130 VERNMENT	851
					111	T	T 306	IVIIII	\L 					ı	FICATION			SCHEDULE DA	ATES T		ACTI	ON T	GO	ACTION	
A C T - V - T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	I N S T R U C T I O N S	C H	S T A R E P O R T S S	CERTIFICATES	Δ	R E C O R D S	O & M M A N U A L S	N F O R M A T I	O V A E P R P N R O M O	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.		h.	i.	j. k. X X	I.	m.	n.	0.	F	p. q.	r.	S.	t.	u.	V.	W.	х.	y.	Z.	aa.
		1.		Fire Alarm Equipment	X	X	Х	Х	<u> </u>	X	X	X	Х	-	G	A/E									
														-											
														1											
										1	-											-			
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										+				+											
										1			 	1-											

SUBMITTAL REGISTER CONTRACT NO. DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 13915 TYPE OF SUBMITTAL CONTRACTOR CONTRACTOR GOVERNMENT CLASSI-**FICATION** SCHEDULE DATES **ACTION ACTION** C E 0 Α Ν C T S T G S & N S M 0 V E D R R С ATEMENTS R S A M P L E S M Ε SUBMIT A W C E P SPECIFICATION Ε R V TO TRANS-Т E C O R D S Ρ APPROVAL MATERIAL Т MITTAL Ε PARAGRAPH **DESCRIPTION OF** D С Ν A T Ν NEEDED NEEDED GOVERN-. O R T S A T Υ M M E NO. NUMBER ITEM SUBMITTED U Ε С MENT С REMARKS 0 0 **SUBMIT** BY BY DATE DATE 0 W 0 0 G E S Ν Ν Ε 0 Ν D D 0 Ο. S S SNY Т D Е Е h. k. n. a. b. C. a. m. 0. p. q. r. s. ٧. u. W. Х. Z. aa. 2.2 **Ductile Iron Pipe & Fittings** 1. X Х 2.3 Steel Pipe & Fittings 2. Χ 3. 2.4 **Dielectric Fittings** Х Χ 4. 2.5 Flexible Connectors Х Χ Χ 5. 2.7 Sprinkler Specialty Fittings **Fire Protection Valves** Χ Χ 6. 2.8 **General Duty Valves** 7. 2.9 Χ Χ 2.10 **Specialty Valves** Х Χ 8. 9. 2.11 **Sprinklers** G A/E 10. 2.12 **Hose Connections** Χ X Χ 11. 2.13 **Hose Stations** Χ 12. 2.14 Wall-Type Fire Hydrants Х Х 13. Fire Dept. Connections 2.15 Χ Χ **Alarm Devices** Х /AE 2.16 14. G 15. 2.17 **Pressure Gages** Χ **Pipe Hangers & Supports** Х 16. 1.5A2 Χ Air Compressors 17. 1.5A4 G A/E **Power Signal & Control** 18. 1.5B X Wiring 1.5C Fire Hydrant Flow Test Χ A/E 19. G **Approved Sprinkler Drawings** Χ G A/E 20. 1.5D 21. **Hydraulic Calculations** A/E 1.5D Χ G 1.5E Field Test Reports & 22. Χ Certificates

	23	1.5F	Welding Certificates)							
	24	1.5G	Field Quality Test Reports)	X						
	25	1.5H	Operation & Maintenance				X X						

								SU	BMIT (E			EG -10)		ΓER	₹										NTRACT NO DACA 31-0	
TITL	E AND I	LOCA		Lincoln Multicultural High S	cho	ol &	Mic	ddle	Schoo	ol						CC	ITNC	RACTOR	?					SPE	CIFICATIO	N SECTION
			Was.	hington, D.C.																					139	921
					TYF	PE OF	SUB	MITT	AL						CLASSI- FICATION				CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI		GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I Т Е М Р О.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S	- N S + R U C + - O Z S	SCHEDULES	S T A T E M P O R T S		SAMPLES	R E C O R D S	O & M M A N U A L S	N F O R M A T I	O V E R N M E N L	P P R O V	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	l.	m.	. n.	0.	. 1	p. q.		r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
		1.		Centrifugal Fire Pumps	Х	X									G	Α	Æ									
		2.		Fire Pump Controllers	X	Х									G	Α	/E									
		3.		Fire Pump Accessories	X	X									X											
		4.		Pressure Maintenance Pumps	Х										G	Α	Æ									
		5.	2.6	Pressure Gages	Х	Х									Х											
		6.	1.4B1	Power, Signal & Control Wiring		Х									Х											
		7.	1.4C	Product Certificates						Х					Х											
		8.	1.4D	Source Quality Test Reports					Х						Х											
		9.		Field Quality Test Reports					Х						Х											
		10.	1.4F	Operation & Maintenance Data									Х	,	G	Α	/E									
			_								L															

							SU						STE	R										ITRACT NO DACA 31-0	
E AND I	LOC			Scho	ol &	Mic	ldle S		`							CONT	RACTOR	?							N SECTION
				TYF	PE OF	SUB	MITTAI	L				1		CLA FICA	ASSI- ATION		(CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO\	/ERNMENT ACTION	
TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	A	D R A S – Z G %	- N N T R U C T - O Z N	C A H E D N	A		F I C A	A M P	R E C O R	& I	F O R M A T I	GOVERNMENT	R E > - E \\ E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
b.	C.		e. Flectric Traction	f.	g.	h.	i. j	j. ŀ	k.	I.	m.	n.	0.	p.	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
		14210	Elevators																						
		14210-3, line 29	Passenger Elevator Machines	x	x			х	X	()	x	3	x		G	A/E									
		14210-3, line 38	Inserts	x	X			Х	X X	()	x	,	x		G	A/E									
		14210-3, line 42	Machine Beams	X	x			Х	×	()	x	3	x		G	A/E									
		14210-3, line 45	Roller Guides	X	x			X	X X	()	x)	X		G	A/E									
		14210-3, line 47	Car Frame & Platform	X	x			X	X	()	x)	X		G	A/E									
		14210-3, line 49	Finish Materials	X	X			X	X	()	X)	X		G	A/E									
	TRANS- MITTAL NO.	TRANS- MITTAL NO. M NO.	TRANS-MITTAL NO. NO. D. C. d. 14210 14210-3, line 38 14210-3, line 42 14210-3, line 45 14210-3, line 45	TRANS-MITTAL T SPECIFICATION PARAGRAPH NUMBER NUMBER DESCRIPTION OF ITEM SUBMITTED b. c. d. e. 14210 Electric Traction Elevators 14210-3, line 29 Machines 14210-3, line 38 14210-3, line 42 14210-3, Roller Guides 14210-3, Car Frame & Platform line 47 14210-3, Finish Materials	TRANS- T SPECIFICATION DESCRIPTION OF ITEM SUBMITTED DA A T A A DESCRIPTION OF ITEM SUBMITTED DESCRIPTION OF ITEM SUBMITTED DA A T A DESCRIPTION OF ITEM SUBMITTED DESCRIPTION OF ITEM SUB	TRANS- I TYPE OF TRANS- I TYPE OF DESCRIPTION OF ITEM SUBMITTED NO. D. A N T G A S D. I A S	Washington, D.C. TRANS- I T SPECIFICATION PARAGRAPH NUMBER PARAGRAPH NUMBER ITEM SUBMITTED D R R U T A N O T G N A S S S T C S N A S S S T T C S N A S S S T T C S N A S S S T T C S N A S S S N A S S S N A S S S N A S S S N A S S S N A S S S N A S S S N A S S S N A S S S N A S S S N A S S S N A S S S N A S S S N A S S N A S S N A S S N A S S N A S S N A S S N A S S N A S S N A S S N A S S N A S S N A S N	E AND LOCATION Bell/Lincoln Multicultural High School & Middle S Washington, D.C. TYPE OF SUBMITTAL I SPECIFICATION PARAGRAPH NUMBER NO. M NO. M NUMBER ITEM SUBMITTED DESCRIPTION OF ITEM SUBMITTED A N O L T G N E A S S S S D R C R U H H A V T D I I U H A N O L T G N E E A S S S S D R C R U H H A N O L T G N E E A S S S S D R C R U H H A N O L T G N E E A S S S S D R C R U H H A N O L T G N E E A S S S S D R C R U H H A N O L T G N E E A S S S S D R C R U H H A N O L T G N E E A S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C R U H H A S S S S D R C	E AND LOCATION Bell/Lincoln Multicultural High School & Middle Schowashington, D.C. TRANS- I SPECIFICATION PARAGRAPH NUMBER ITEM SUBMITTED D	CEAND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	TRANS- T SPECIFICATION DESCRIPTION OF NO. TRANS- T	TRANS	CER 415-1-10	TRANS- T	CLASSIFICATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.	CONTINUED CONT	CONTRACTOR Seli/Lincoln Multicultural High School & Middle School CONTRACTOR Washington, D.C.	TRANS- T	CONTRACTOR CON	CONTRACTOR Sell/Lincoln Multicultural High School & Middle School CONTRACTOR TRANS TRAN	TRANS TRAN	TRANS	DACA 31-0 DACA		

	14210-4, line 1	Operation Systems	X	X		X	X	X	X		G	A/E				
	14210-4, line 24	Signal Equipment	X	x		X	X	X	X		G	A/E				
	14210-5, line 19	Door Reopening Device	x	x		X	X	X	X		G	A/E				
	14210-5, line 36	Passenger Elevator Car Enclosures	X	x		X	X	X	X		G	A/E				
	14210-5, line 55	Passenger Hoistway Entrances	X	x		x	X	X	X		G	A/E				
		Shop Drawings	X	x							G	A/E				
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TITL	E AND	LOCA		Lincoln Multicultural High Solington, D.C.	cho	ol &	z Mi	iddle	Schoo	ol		·				C	ITNC	RACTOR	?					SPE 147		N SECTION
					TYF	PE OF	SUE	ЗМІТТ	AL						CLASSI- FICATIO	N.		;	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON		VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S	- N S T R U C T - O Z S	SCHEDULES	S T A T E P O R T S S	CERTIFICATES	S	R E C O R D S	A N U A	k I	I N G O V R E M N T O M E O L N T	P R O V E	R E > − E ⊗ E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	l.	m	. n.	0	١.	p. q	.	r.	S.	t.	u.	٧.	W.	x.	y.	Z.	aa.
			14700	Turn Table																						
			14700-1, line 39	Wheels	x	X	X		Х	X			X		G	6 A	\/E									
			14700-1, line 46	Track	X	X	X		X	X			X		G	3 A	VE									
			14700-1, line 52	Center Post	X	X	X		X	X			X		G	3 A	VE									
			14700-1, line 58	Floor Support Structure	X	X	X		X	X			X		G) A	VΕ									
				Stepped Riser Floor Structure	X	X	X		X	X			X		G) A	VE									
				Stationary Trim & Curb Angle	X	X	X		X	X			X		G	3 A	VE									
			14700-2, line 10	Drive Systems	X	X	X		х	X			X		G	S A	VΕ									

14700-2, line 17	Control System	X	X	Х	X	x		X	G	A/E				
14700-2, line 56	Operation	X	X	X	X	X		X	G	A/E				
14700-3, line 24	Painting & Lubrication	X	X	x	x	x		x	G	A/E				
	Shop Drawings	X	X						G	A/E				
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15050 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Α Ν C S T G O S & N S M V E R D R A W С ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D C A T R N TRANS-SPECIFICATION V APPROVAL MATERIAL TO Ρ PARAGRAPH Τ MITTAL Ε **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E M NUMBER ITEM SUBMITTED U C O NO. Ε BY DATE MENT С 0 0 **SUBMIT** BY DATE REMARKS N G S 0 W 0 N O N S E S E S N T Ν 0 Ε Ε D D Ο. S N Y D Е Е d. h. k. n. a. b. C. e. g. m. 0. p. q. r. S. u. ٧. W. х. у. Z. aa. Installation and coordination 3.1 G ΑE drawings ΑE 3.2 Χ G Lay drawing X G ΑE Service Clearance Χ ΑE G ΑE Pipe/Duct Equipment X G Х ΑE **Electrical Devices** G **Control Panels** Χ G ΑE 2 Perpendicular Sections ΑE X G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15055 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS S A M P L E S SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS O N S N G S W N O E S E S N T Ν 0 Ε Ε D D Ο. S N Y D Ε Ε d. h. k. n. a. b. C. e. g. i. I. m. 0. p. q. r. s. u. ٧. W. х. у. z. aa. 2.2 **Motors and Controls - Field** G ΑE Installed

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15060 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS S A M P L E S SUBMIT R E P O R T S R E C O R D S SPECIFICATION E D TRANS-APPROVAL MATERIAL TO C Ρ MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS O N S N G S W N O E S E S N T Ν 0 Ε Ε D D Ο. S N Y D Е Е d. k. n. a. b. C. e. g. h. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 2.2.A Pipe Hangers, Supports X G ΑE ΑE **Attachment to Structure** G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15071 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS S A M P L E S SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** D С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS N G S 0 W N O N S E S N T Ε 0 Ε Ε D D Ο. S S N Y D Ε Ε d. k. b. C. e. g. h. m. n. 0. p. q. r. s. u. ٧. W. х. z. aa. Attachment to Structure G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15075 CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N S M V E R N R R E D R A W С ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D C A T TRANS-SPECIFICATION APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS N G S 0 W N O N S E S N T Ν Ε 0 D D Ο. S S N Y D Е Е d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. х. Z. aa. **Eqpt ID Devices** FIO 2.1.A Piping ID Devices FIO 2.2 2.3 **Duct ID Devices** FIO FIO 2.4 Stencils 2.5 Valve Tags FIO 2.6 Valve Schedules FIO 2.7 **Warning Tags** FIO

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15081 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N S M V E R N R D R A W С ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D C A T TRANS-SPECIFICATION APPROVAL MATERIAL TO Ρ Ε PARAGRAPH Τ MITTAL **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O Ε BY DATE MENT С 0 0 **SUBMIT** BY DATE REMARKS A T A N G S 0 W 0 N O N S E S N T Ν Ε 0 Ε D D Ο. S S N Y D Е Е d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. х. z. aa. FIO 1.3.A Installer Qualifications 1.3.B Fire-Test-Response FIO Characteristics 2.2 Insulation Materials FIO 2.3 Field Applied Jacket FIO 2.4 Accessories & Attachment FIO 2.5 FIO Vapor Retarders

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15082 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N S M R V E R N D R A W С ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D TRANS-SPECIFICATION V APPROVAL MATERIAL TO Ρ Ε PARAGRAPH Τ MITTAL **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 **SUBMIT** BY DATE REMARKS N G S 0 W N O N S E S E S N T Ν 0 Ε D D Ο. S N Y D Е Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. х. z. aa. FIO 1.3.A Installer Qualifications 1.3.B Fire-Test-Response FIO Characteristics 2.2 Insulation Materials Х FIO

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15083 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C S T G O S & N S M V E R D R A W С ATEMENTS R Ε S A M P L E S M Ρ SUBMIT R E P O R T S R E C O R D S C E D C A T R N TRANS-SPECIFICATION APPROVAL MATERIAL TO Ρ PARAGRAPH Τ MITTAL Ε **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E M NUMBER ITEM SUBMITTED NO. U Ε BY С DATE MENT С 0 0 **SUBMIT** BY DATE **REMARKS** A T A N G S 0 W 0 0 N O N S E S N T Ν Ε 0 D D Ο. S S N Y D Е Е d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. х. Z. aa. FIO 1.3.A Installer Qualifications 1.3.B Fire-Test-Response FIO Qualifications 2.2.A Mineral Fiber Insulation FIO 2.2.B Flex Elastomeric ΑE G 2.2.C FIO **Prefab Insulation Covers** 2.3 Field Applied Jackets FIO 2.4 Accessories & Attach FIO 2.5 FIO Vapor Retarders

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15110 CLASSI-CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL CONTRACTOR SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Α Ν C S T G O S & N S M V E R D R A W С ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S C E D C A T R N TRANS-SPECIFICATION V APPROVAL MATERIAL TO Ρ Ε PARAGRAPH Τ MITTAL **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E M NUMBER ITEM SUBMITTED U C O NO. Ε **SUBMIT** BY DATE MENT С 0 0 BY DATE REMARKS N G S 0 W 0 N O N S E S N T Ν Ε 0 Ε Ε D D Ο. S SNY D Е Е d. h. k. n. a. b. C. e. g. m. 0. p. q. r. S. u. ٧. W. х. aa. Z. 2.3 Copper-alloy ball valves Ferrous-alloy ball valves 2.4 X 2.5 High-pressure butterfly Χ valves 2.6 Bronze check valves 2.7 Gray-iron swing check valves X X 2.8 Spring-loaded liftdisc check X Χ val 2.9 Bronze gate valve X 2.10 Cast-iron gate valve X 2.11 Bronze globe valve Χ X 2.12 Cast iron glob valve

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15121 CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL **FICATION ACTION ACTION** C E 0 A C T Ν S T G O S & N S M R V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D C A T TRANS-SPECIFICATION APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS O N S N G S W N O E S E S N T Ν 0 Ε Ε D D Ο. S N Y D Е Е d. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. aa. Z. ΑE 2.2 **Expansion joint** G ХХ 2.3 ΑE Alignment guide G Anchors ХХ G ΑE ΑE **Layout Drawing** х х G х х ΑE **Expansion Loop** G

	SUBMITTAL REGISTER (ER 415-1-10) TLE AND LOCATION Bell/Lincoln Multicultural High School & Middle School CONTRACTOR																TRACT NC DACA 31-0								
TITL	E AND I	LOCA	ATION Bell/	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle	•							CON	TRACTOF	3					SPE	CIFICATIO	N SECTION
			was	imigton, D.C.																			151		
					TYF	PE OF	DF SUBMITTAL								CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GO	VERNMENT ACTION	
A C T - V - T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A & - N G %	I N S T R U C T I O N S	SCHEDULES	S T A T F E E M F F E N F F T S S S	C E R T I F I C A T E S	S	R E C O R D S	O & M A N U A L S	N F O R M	O V A E P N R P N R O M O E V L N E O Y T D	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	СОDЕ	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j. k	i. I.	m	. n.	0.	1	p. q.	r.	S.	t.	u.	٧.	W.	x.	y.	Z.	aa.
				Mtl-case, liq-in-gls thermometer	X			X							Х										
				Direct-mount vapor activated	Х			Χ							Х										
				Dial thermometers																					
				Thermowells	Х										Х										
				Pressure Gages	X										X										
				Test Plugs	X	1									X										
			2.0	1 oct i lago											A										
					1	1							+	\dashv											
					1	1					+		+												
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					1	1																1			

	SUBMITTAL REGISTER (ER 415-1-10) THE AND LOCATION Rell/Lincoln Multicultural High School & Middle School CONTRACTOR																NTRACT NO DACA 31-0									
TITL	TLE AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C. CONTRACTOR															SPE	CIFICATIO	N SECTION								
			Was	hington, D.C.																				151		
					TYF	PE OF	SUE	SUBMITTAL								ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI		GO	VERNMENT ACTION	
A C T I V I T Y NO	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A S - Z G S	I N S T R U C T I O N S	8 C H H D D L H 8	S T A T E M P O R T T S	C E R T I C A T E S	S	R E C O R D S	8 N N	A A A A A A A A A A A A A A A A A A A	FOR MONLY	GOVERN MENT	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. I.	m	ı. n.	0). 	p.	q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			2.3	Steel Pip & Fittings	X)												
			2.4.A	Soft Copper Tube & Fittings	X)	X											
			2.4.B	Hard Copper Tube & Fittings	Х)	X											
			2.5	PEX Pipe Fittings	Х)	X											
			3.8.A	Field QC Insp. Dom Water Piping Inspec					Х		X)												
			3.8.B	Field QC test Dom Water Piping Samp.					Х)	X											
			3.10.A	Cleaning - Water Samples					Х)	X											
			3.10.B	Cleaning-Purging & Disinfect					Х)	X											
				Chrome Piping - location in kitchen	X	X										G	AE									
					1																					<u> </u>
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					1	+				+		+		\dashv												
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15150 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N S M V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** D С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS N G S 0 W N O N S E S E S N T Ν 0 Ε D D Ο. S N Y D Е Ε d. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. z. aa. Soil Piping 2.2.A Х 2.2.B **Fittings** Χ ХХ Chrome Pipes located in G ΑE kitchen

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15160 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** D С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS N G S 0 W N O N S E S E S N T 0 Ε D D Ο. S N Y D Е Ε d. h. k. n. a. b. C. e. g. I. m. 0. p. q. r. S. u. ٧. W. х. z. aa. **PVC Soil Piping** 2.2.A Х 2.2.B **Fittings**

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15181 CLASSI-CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL CONTRACTOR SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N S M R V E R N R E D R A W С ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D C A T TRANS-SPECIFICATION V APPROVAL MATERIAL TO Р Ε PARAGRAPH Τ MITTAL **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε **SUBMIT** BY DATE MENT 0 0 BY DATE REMARKS N G S 0 W N O N S E S E S N T Ν 0 Ε D D Ο. S N Y D Е Е C. d. h. k. n. a. b. e. g. m. 0. p. q. r. S. u. ٧. W. х. у. Z. aa. **Calibrated Balancing Valves** 2.6.C Calibrated Balancing Valves Χ 2.6.D Pressure-reducing Valves 2.6.E ΑE G 2.6.F ΑE Safety Valves G **Automatic Flow Control** ΑE 2.6.G G Valves **Expansion Tanks** 2.7.C X X 2.7.D In-Line Air Separators х х

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15183 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N S M R V E R N R E D R A W ATEMENTS R E P O R T S S A M P L E S M SUBMIT R E C O R D S E D C A T TRANS-SPECIFICATION Ρ V APPROVAL MATERIAL TO MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-Ü M E N T NO. M NUMBER ITEM SUBMITTED Ε C O C 0 **SUBMIT** BY DATE MENT DATE REMARKS 0 BY O N S N G S W N O E S E S Ν 0 D D Ο. S N Y D Е Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. х. у. z. aa. Valves 2.3 хх 2.4 Refrigerant Piping Speciaties X Refrigerant Pipe Layout and X X G ΑE Sizing

	SUBMITTAL REGISTER (ER 415-1-10)																NTRACT NO DACA 31-0									
TITL	TLE AND LOCATION Bell/Lincoln Multicultural High School & Middle School Washington, D.C.															SPE	CIFICATIO	N SECTION								
			was	mington, D.C.																				151		
					TYPE OF SUBMITTAL											ASSI- ATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T - V - T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S	- N S T R U C T - O Z S	SCHEDULES	S T A T E M E N T S	R	CERTIFICATES	S A M P L E S	RECORDS	A N U A	I N F O R M A T I O N	E V	W E	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j.	k.	l.	m.	n.	0.	p.	q.	r.	s.	t.	u.	V.	w.	x.	y.	Z.	aa.
				General Pumps Requirement										Χ		G	AE									
				In-Line Circulators	Χ	X								Χ		G	AE									
			2.4		Χ									X		G	AE									
			2.5	Flex-Coupled-End suction	Х	Х								Χ		G	AE									
			2.6.A	Suction Diffuser	Х											G	AE									
					Х	Х										G	AE									
				-																						
				-																						
				-																						
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15189 TYPE OF SUBMITTAL CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N S M V E R N D R A W ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S TRANS-SPECIFICATION V APPROVAL MATERIAL TO Р Ε PARAGRAPH Τ **MITTAL DESCRIPTION OF** D С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 **SUBMIT** BY DATE REMARKS N G S 0 W N O N S E S E S N T Ν 0 Ε D D Ο. S N Y D Е Ε d. h. i. k. n. a. b. C. e. g. m. 0. p. q. r. S. u. ٧. W. х. у. z. aa. 2.2 **Chemical Feeding** G ΑE Equipment 3.1 ΑE Water Analysis Χ G Chemicals G ΑE G ΑE **Treatment Process** Χ

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15191 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O & N S M V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Ċ **DESCRIPTION OF** D Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS N G S 0 W N O N S E S E S N T Ν 0 Ε Ε D D Ο. S N Y D Е Ε d. h. k. n. a. b. C. e. g. m. Ο. p. q. r. s. u. ٧. W. х. z. aa. **Piping Materials** 2.2 X G ΑE 2.3 ХХ ΑE **Specialty Valves** G Fuel Oil Transfer Pumps ХХ Χ ΑE 2.4 G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15194 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N S M V E R N R R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D C A T TRANS-SPECIFICATION APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O Ε **SUBMIT** BY DATE MENT С 0 BY DATE REMARKS N G S 0 W 0 N O N S E S E S N T Ν 0 Ε Ε D D Ο. S N Y D Е Е d. k. n. a. b. C. e. g. h. m. Ο. p. q. r. s. u. ٧. W. х. Z. aa. 2.1.A.5 Service Meter Bars ΑE G ΑE 2.1.A.6 Service Meter By-Pass Shift G 2.6 Specialty Valves Χ G ΑE 2.7 Pressure Requiators ΑE G ΑE **Layout Drawing** X G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15221 CLASSI-CONTRACTOR TYPE OF SUBMITTAL CONTRACTOR GOVERNMENT **FICATION** SCHEDULE DATES **ACTION ACTION** C E 0 Ν C S T G O S & N S M V E R D R A W С ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S RECORDS R N TRANS-SPECIFICATION Ε APPROVAL MATERIAL TO Р Ε PARAGRAPH Ċ Τ MITTAL **DESCRIPTION OF** D Ν A T NEEDED NEEDED GOVERN-M E M NUMBER ITEM SUBMITTED NO. U Ε BY С DATE MENT С 0 0 **SUBMIT** BY DATE REMARKS N G S 0 W 0 0 N O N S E S N T Ν Ε 0 Ε D D Ο. S S NY D Е Е d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. х. у. Z. aa. **Piping Materials** 2.2 2.3 Pipes, Tubes, Fittings Χ 2.5 **Special Duty Valves** ΑE G Plastic Neutralization Tank ΑE 2.6.A G 2.6.B Plastic Dilution Trap ΑE G 2.6.C Corrosion Resist. Trap 2.6.D Plastic Backwater Valve X 2.7 **Neutralization System** \mathbf{X}

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15410 CLASSI-CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL CONTRACTOR SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C S T G O S & N S M V E R D R A W ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D C A T R N TRANS-SPECIFICATION APPROVAL MATERIAL TO Р Ε PARAGRAPH Τ MITTAL **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-Ü M E M NUMBER ITEM SUBMITTED C O NO. Ε BY DATE MENT С 0 **SUBMIT** BY DATE REMARKS N G S 0 W 0 N O N S E S N T Ν Ε 0 D D Ο. S SNY D Е Е d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. Х. Z. aa. 2.2 Lavatory Faucet 2.3 Shower Faucet X 2.4 Sink Faucet Χ 2.5 Flushometer Χ 2.6 **Toilet Seat** X 2.7 Fixture Support Χ 2.8 Water Closet Χ 2.9 Urinals X 2.10 Χ Lavatories Χ 2.11 **Counter Sinks** Χ 2.12 **Service Basins** X 2.13 **Laundry Trays** Χ 2.14 Art Class Sink X

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15415 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS O N S N G S W N O E S E S N T Ν 0 D D Ο. S N Y D Е Ε d. h. k. n. a. b. C. e. g. I. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 2.2.A **Pressure Water Cooler** G ΑE 2.3 Fixture Support FIO

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15430 TYPE OF SUBMITTAL CONTRACTOR CONTRACTOR GOVERNMENT CLASSI-SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Α Ν C T S S T G & N S M 0 V E R D R A W С ATEMENTS R S A M P L E S M Ε SUBMIT C E P R N TRANS-SPECIFICATION TO E C O R D S Р APPROVAL MATERIAL Ċ Т MITTAL Ε PARAGRAPH **DESCRIPTION OF** D Ν A T NEEDED NEEDED GOVERN-. O R T S A T M E Υ M NUMBER ITEM SUBMITTED NO. U Ε BY С MENT С 0 0 **SUBMIT** BY DATE DATE **REMARKS** N G S 0 W 0 0 E S Ν Ν Ε 0 Ν Ε D D Ε 0 Ο. S S SNY Т D Е Е d. k. n. b. C. e. g. h. m. 0. p. q. a. r. s. u. ٧. w. Х. Z. aa. Backflow Preventer 2.2 2.4 Χ Water Regulators 2.5 Balancing Valves X 2.6 Water Filters 2.7 Therm. Water Mixing Valves 2.8 Water Tempering Valve X X 2.9 Strainers X 2.10 Washer Boxes Hose Stations ХХ 2.11 2.12 Key Operated Wall Hydrants ХХ 2.13 Trap Scal Primer Valves 2.14 Drain Valves X 2.15 **Back Water Valves** X 2.16.B Hose Bibbs Χ Χ 2.16.C Air Vents 2.16.D Air Admittance Valves X 2.16.E Roof Flashing Assemblies X Open Drains 2.16.F X 2.16.K Vent Caps Χ Vent Terminals 2.16.L 2.17 Sleeve Penetration System Χ 2.19 X Cleanouts 2.20 Floor Drain X 2.21 Trench Drain

	2.22	Roof Drain	Х				X						
	NEW	Grease Interceptors	Х	Χ			X						
		Grease & Sediment	Х	Χ			X						

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15446 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O & N M V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S SPECIFICATION E D TRANS-I C A T APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E N T NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS O N S N G S W N O E S E S Ν 0 D D Ο. S N Y D Е Ε d. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. z. aa. Submersible Sump Pump 2.3 G ΑE 2.4 **Sump Pump Pit** 2.5 **General Duty Valves**

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15450 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S SPECIFICATION C A T TRANS-APPROVAL MATERIAL TO Р Ε PARAGRAPH Т **MITTAL DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E N T NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε BY DATE MENT 0 **SUBMIT** BY DATE REMARKS O N S N G S W N O E S E S Ν 0 D D Ο. S N Y D Е Е d. h. k. n. a. b. C. e. g. m. 0. p. q. r. S. u. ٧. W. х. z. aa. Steel, Insul, Double Wall Agst X X ΑE 2.2 G Specialties & Accessories 2.2.E

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15486 TYPE OF SUBMITTAL CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N M V E R N D R A W ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D TRANS-SPECIFICATION V APPROVAL MATERIAL TO Р Ε PARAGRAPH Τ MITTAL **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 **SUBMIT** BY DATE REMARKS O N S N G S W N O E S E S N T Ν 0 Ε Ε D D Ο. S N Y D Е Е d. h. k. n. a. b. C. e. g. m. 0. p. q. r. S. u. ٧. W. х. у. aa. Z. **Tankless Gas Water Heater** 2.2 G ΑE (point of use) 2.3 Water Heater Accessories \mathbf{X} G ΑE Pipe Layout х х G ΑE ХХ ΑE **Expansion Tank** G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15512 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N S M V E R N R R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D C A T TRANS-SPECIFICATION V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E N T NO. M NUMBER ITEM SUBMITTED U Ε C O C 0 **SUBMIT** BY DATE MENT 0 BY DATE REMARKS O N S N G S W N O E S E S Ν 0 D D Ο. S N Y D Е Ε d. h. k. n. a. b. C. e. g. m. 0. p. q. r. S. u. ٧. W. х. z. aa. **Packaged Cast Iron Boiler** 2.2 х х 2.4 Combination Gas/Oil Burner ХХ 2.5 Hot Water Boiler Trim ХХ

	SUBMITTAL REGISTER (ER 415-1-10) TILE AND LOCATION Bell/Lincoln Multicultural High School & Middle School CONTRACTOR																ITRACT NO DACA 31-0								
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a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. l.	m	n. n.	. (ο.	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			1.3.B	Wleding Certificates											X										
				Warranties					X	X					X										
			2.2	Listed Type "B" and "BW" Vents	X									,	X										
			2.3		Χ										Х										
				Listed Type Special Gas Vent	X										X										
			2.5	Listed Building-Heating Appliance Chimney	X										X										
			2.6	Listed Grease/Dishwasher Ducts	X										Х										
			2.7		Х										Х										
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15640 TYPE OF SUBMITTAL CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N S M V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D TRANS-SPECIFICATION V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 **SUBMIT** BY DATE REMARKS A T A N G S 0 W N O N S E S N T Ν Ε 0 Ε Ε D D Ο. S S N Y D Е Ε d. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. у. z. aa. 2.2 Induced Draft Cross Flow G ΑE **Cooling Towers** х х ΑE 2.3 Motors G 2.4 **Basin Heaters** х х G ΑE Controls х х ΑE G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15671 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N S M V E R N R R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S C A T TRANS-SPECIFICATION Ρ ٧ APPROVAL MATERIAL TO MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E N T NO. M NUMBER ITEM SUBMITTED U Ε C O C 0 **SUBMIT** BY DATE MENT 0 BY DATE REMARKS O N S A T A N G S W N O E S E S Ν 0 D D Ο. S N Y D Е Е d. h. k. n. a. b. C. e. g. m. 0. p. q. r. S. u. ٧. W. х. z. aa. Condensing Units 1-5 tons 2.2 \mathbf{X} хх 2.3 Condensing Units 6-12 tons

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15672 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS R E P S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS A T A N G S 0 W N O N S E S N T Ε 0 Ε D D Ο. S S N Y D Е Ε d. f. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 2.2 Air Cooled Dry Cooler G ΑE х х ΑE Controls G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15700 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N M V E R N D R A W ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S TRANS-SPECIFICATION APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS N G S 0 W N O N S E S E S N T 0 Ε Ε D D Ο. S N Y D Е Ε d. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. Z. aa. Variable Freq. Drives 2.2 X X G ΑE 2.3 ΑE **Enclosures** G X X ΑE 2.4 Accessories G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15710 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O & N M V E R N R E D R A W ATEMENTS S A M P L E S SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS A T A N G S 0 W N O N S E S N T Ν Ε 0 Ε Ε D D Ο. S S N Y D Е Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. s. u. ٧. W. х. aa. Z. 2.2 Plate Heat Exchanger G ΑE х х ΑE Controls G X X Relief Valve ΑE G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15726 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O & N M V E R N D R A W ATEMENTS R R E P Ε S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS N G S 0 W N O N S E S N T Ε 0 Ε Ε D D Ο. S S N Y D Ε Ε d. h. k. n. a. b. C. e. g. I. m. 0. p. q. r. s. u. ٧. W. х. aa. Z. 2.2 Manufactured Units ERU Χ G ΑE ХХ ΑE Controls G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) Bell/Lincoln Multicultural High School & Middle School CONTRACTOR SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15732 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N D R A W ATEMENTS R R E P Ε S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O DATE C 0 U Ε BY MENT 0 SUBMIT BY DATE REMARKS A T A N G S 0 W N O N S E S N T Ε 0 Ε Ε D D Ο. S S N Y D Ε Ε d. k. b. C. e. g. h. m. n. 0. p. q. r. s. u. ٧. W. х. z. aa. Noise G ΑE Controls XX ΑE G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15738 CLASSI-CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL CONTRACTOR SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Α Ν C T S T G O S & N S M V E R D R A W С ATEMENTS R R E P Ε S A M P L E S M SUBMIT R E C O R D S C R N TRANS-SPECIFICATION V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** D С Ν A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε **SUBMIT** BY DATE MENT 0 0 BY DATE REMARKS A T A N G S 0 W N O N S E S N T Ν Ε 0 Ε Ε D D Ο. S S N Y D Е Ε d. f. h. i. k. n. a. b. C. e. g. m. 0. p. q. r. S. t. u. ٧. W. х. у. z. aa. 2.2 **Concealed Evaporator Fan** ΑE G Components Floor Mounted Evap. Fan ХХ ΑE 2.3 Χ G Components Air-Cooled Compressor ХХ G ΑE 2.4 X **Condenser-Components** ΑE **Complete Unit** X X G Noise ΑE G \mathbf{X} G ΑE Controls

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15745 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O & N M V E R N R E D R A W ATEMENTS S A M P L E S SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS A T A N G S 0 W N O N S E S N T Ε 0 Ε Ε D D Ο. S S N Y D Е Ε d. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. aa. Z. Water Source Heat Pump 2.2 G ΑE ΑE **Noise Ratings** G ΑE Controls G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15766 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N D R A W ATEMENTS R R E P Ε S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS A T A N G S 0 W N O N S E S N T Ε 0 D D Ο. S S N Y D Ε Ε d. f. h. k. n. a. b. C. e. g. i. I. m. 0. p. q. r. s. u. ٧. W. х. aa. Z. 2.2 **Cabinet Unit Heater** ХХ Controls G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15767 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS R E P S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS A T A N G S 0 W N O N S E S N T Ε 0 D D Ο. S S N Y D Ε Ε d. h. k. n. a. b. C. e. g. I. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 2.2 **Propeller Unit Heaters** Χ ХХ Controls G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15775 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O & N M V E R N R E D R A W ATEMENTS S A M P L E S SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** С A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O DATE C 0 U Ε **SUBMIT** BY MENT 0 BY DATE REMARKS A T A N G S 0 W N O N S E S E S N T 0 D D Ο. S N Y D Ε Ε d. f. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 1.2 **Electric Heating Cables** G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15815 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N S M R V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D C A T TRANS-SPECIFICATION V APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-Ü M E NO. M NUMBER ITEM SUBMITTED Ε C O C 0 **SUBMIT** BY DATE MENT 0 BY DATE REMARKS N G S 0 W N O N S E S E S N T Ν 0 Ε D D Ο. S N Y D Е Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. х. z. aa. **Duct Liner** FIO 2.3 2.6 Rectangular Duct FIO 2.8 Single Wall Round Spiral FIO 3.3 Range Hood Exhaust Double FIO Wall

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15820 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N S M R V E R N D R A W С ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D TRANS-SPECIFICATION l C V APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS N G S 0 W N O N S E S E S N T Ν 0 Ε D D Ο. S N Y D Е Е d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. х. у. Z. aa. **Backdraft Damper** FIO 2.3 2.4 FIO **Volume Damper** 2.5 **Motorized Control Damper** FIO 2.6 Fire Damper X X ΑE G х х 2.7 ΑE **Smoke Damper** G 2.8 **Turning Vanes** FIO

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15838 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N S M R V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D TRANS-SPECIFICATION V APPROVAL MATERIAL TO Ρ Ε PARAGRAPH Ċ Τ MITTAL **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS A T A N G S 0 W N O N S E S N T Ν Ε 0 Ε Ε D D Ο. S S N Y D Е Е d. f. h. k. n. a. b. C. e. g. m. 0. p. q. r. S. u. ٧. W. х. aa. Z. **Utility Set Fans** ХХ ΑE 2.2 G ХХ Centrifugal Roof Ventilators ΑE 2.3 G ХХ 2.4 In-Line Centrifugal Fans G ΑE 2.5 **Propeller Fans** х х ΑE G Fume Hood Exhaust Fans х х ΑE 2.6 G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15840 TYPE OF SUBMITTAL CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T G O S & N M V E R N D R A W ATEMENTS R R E P Ε S A M P L E S SUBMIT R E C O R D S TRANS-SPECIFICATION V APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS N G S 0 W N O N S E S N T Ε 0 Ε Ε D D Ο. S S N Y D Е Ε d. f. h. k. n. a. b. C. e. g. i. I. m. 0. p. q. r. s. u. ٧. W. х. aa. Z. 2.2 Air Terminal Units G ΑE ΑE Noise G X X ΑE Controls G

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15852 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O & N M V E R N R E D R A W ATEMENTS S A M P L E S SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Т **DESCRIPTION OF** С A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O DATE C 0 U Ε **SUBMIT** BY MENT 0 BY DATE REMARKS A T A N G S 0 W N O N S E S E S N T 0 Ε D D Ο. S N Y D Ε Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 1.2 **Dust Collection System** \mathbf{X} G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15854 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O & N M V E R N R E D R A W ATEMENTS R E P S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O DATE C 0 U Ε **SUBMIT** BY MENT 0 BY DATE REMARKS N G S 0 W N O N S E S E S N T 0 Ε D D Ο. S N Y D Ε Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 1.2 Welding Exhaust System \mathbf{X} G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15855 CLASSI-CONTRACTOR CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C S T G O S & N S M V E R D R A W С ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S R N TRANS-SPECIFICATION APPROVAL MATERIAL TO Ρ Ε PARAGRAPH Τ MITTAL **DESCRIPTION OF** D С Ν A T NEEDED NEEDED GOVERN-M E M NUMBER ITEM SUBMITTED C O NO. U Ε BY DATE MENT С 0 0 **SUBMIT** BY DATE REMARKS A T A N G S 0 W 0 N O N S E S N T Ν Ε 0 Ε D D Ο. S S N Y D Е Е d. k. n. a. b. C. e. g. h. m. 0. p. q. r. S. u. ٧. W. х. Z. aa. Adjustable Bar Grille 2.2.A 2.2 Fixed Face Grille "A" 2.2 Fixed Face Grille "C" Χ 2.2 Fixed Face Grille "B Χ 2.3.A Linear Slot Diffuser "E" X Linear Slot Diffuser "D" 2.3.B Χ **Round Ceiling Diffuses** 2.4.A Χ 2.4.B Square Ceiling Diffuser

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15900 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O & N M V E R N R E D R A W ATEMENTS R E P S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS N G S 0 W N O N S E S E S N T 0 D D Ο. S N Y D Е Ε d. h. k. n. a. b. C. e. g. i. I. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 1.2 **Control Logic Diagram** G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 15940 CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Α Ν C T S T G O S & N S M V E R D R A W С ATEMENTS R Ε S A M P L E S M SUBMIT R E P O R T S R E C O R D S E D R N TRANS-SPECIFICATION V APPROVAL MATERIAL TO Ρ C A T PARAGRAPH Τ MITTAL Ε **DESCRIPTION OF** Ν A T NEEDED NEEDED GOVERN-Ü M E M NUMBER ITEM SUBMITTED NO. Ε BY С DATE MENT С 0 0 **SUBMIT** BY DATE REMARKS N G S 0 W 0 0 N O N S E S N T Ν Ε 0 Ε D D Ε Ο. S SNY D Е Е d. h. k. n. b. C. e. g. i. m. Ο. p. q. r. S. u. ٧. a. W. Х. Z. aa. 1.4 Wshp control Seq. G ΑE Χ ΑE 1.5 ERU Control Seq. G Χ 1.6 Pri. Heating Water C.S. G ΑE Central Refrig Eqpt. Schd. ΑE 1.7 Χ G ΑE 1.8 Single Zone, CV, Attu CS Χ G 1.9 Single Zone, VAV, AHUCS Χ ΑE G Terminal Unit Operat. Χ ΑE 1.10 G Sequence **Exhaust Fan** Χ 1.11 A G ΑE ΑE 1.11 B Kitchen Exhaust Fan Χ G

CONTRACT NO. SUBMITTAL REGISTER DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 15950 TYPE OF SUBMITTAL CONTRACTOR CONTRACTOR GOVERNMENT CLASSI-**FICATION** SCHEDULE DATES ACTION **ACTION** C E 0 Α Ν C T S T R G S & S M 0 V E D R R С ATEMENTS R U M R Ε **SUBMIT** SAMPLES A W C E P E TRANS-**SPECIFICATION** Е R V TO Ρ APPROVAL MATERIAL Т MITTAL Ε **PARAGRAPH DESCRIPTION OF** D С Ν A T Ν NEEDED NEEDED GOVERN-O R T O R D S Υ М Α M E NO. NUMBER ITEM SUBMITTED U Ε С DATE MENT С 0 0 **SUBMIT** BY BY DATE REMARKS A T N G S 0 Т W 0 0 Ν Ν Е 0 Ν Е D D Ε Ε 0 Ο. Α S S S S S NY Т D Ε Е d. k. n. b. C. e. g. h. m. Ο. p. q. r. s. ٧. a. u. w. X. ٧. Z. aa. 1.4 Submittals G ΑE 1.32.A Initial Construction Prase X G ΑE **Rpts** 1.32.B Status Report Χ ΑE G 1.33.B Cert. Sheet Final Report Χ ΑE Χ G **Final Report Contents** ΑE 1.33.C Χ Χ Χ X G ΑE 1.33.E System Diagrams X Χ G 1.33.F Air Handling Unit Test Rpts Χ G ΑE X **Apparatus Coil Test Report** ΑE 1.33.G X X X G Gas/Oil Heat Apparatus ΑE 1.33.H Χ X G 1.33.I Fan Test Report Χ Χ Χ G ΑE **Duct Transverse Report** ΑE 1.33.J X X G Air Terminal Device Report ΑE 1.33.K Χ X Χ G 1.33.L System Coil Report Χ Χ G ΑE 1.33.M Compresssor/Condenser Rpt X X X X G ΑE **Cooling Tower Report** ΑE 1.33.N Χ X G Heat Exchanger Report Χ Χ Χ ΑE 1.33.0 Χ G ΑE 1.33.P Pump Test Report X X X G 1.33.Q **Boiler Test Report** Χ X ΑE Χ Χ G 1.33.R Air to Air Heat Recovery Χ Χ G ΑE Sound Measurement Report ΑE 1.33S Х Χ Χ Χ G ΑE 1.33.T Instrument Calibration Χ Χ X G 1.34.A Χ Χ X ΑE Χ G Inspections - Initial ΑE 1.34.B Inspections - Final Χ Χ X G

1.3	35	Additional Tests X		Х		Х	7	G	AE					

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			2.3	Electricity Metering		X			Х					X	G	AE									
				Coordination	Х	Х									G	AE									
				CT Cabinet		Х				X					G	AE									
			2.2	Utility		Х									G	ΑE									
			1.4b	Coordination	Х										G	AE									
			3.1	Coordination Drawing		Χ									G	AE									
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A C T - V - T Y N O	TRANS- MITTAL NO.	I T E M NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RGS	- NSTRUCT-ONS	0 C T E D D L E 0	S T A T E E P O R T T S S	CERTIFICATES		RECORDS	O & M M A N U A L S	N F O R M A T I	O V A E P N R P N R	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	l.	m.	n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
				Grounding Conductors	Х				Х					X											
				Connector Products	Х				Х					X											
			2.4	Grounding Electrodes	Х				Х					X											
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			1.3	Raceway & Cable Labels	X									X											
			1.3	Nameplates & Signs	X		-							X											
			1.3	Miscellaneous ID Prod.	X									Х	\										
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					TYI	PE OF	SUE	MITT	AL					F	CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T - V - T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	G	I N S T R U C T I O N S	\circ C H \circ D J L \circ	S T A T E E M P O N R T S S	CERTIFICATES		RECORDS	O & M M A N U A L S	N F O R M A T	GOVERNOVED ONLY	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 1.5	e. Conductors & Cables	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	X). q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
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TITI	E AND	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	Mi	ddle	Schoo	ol							CONT	RACTOR	?						CIFICATIO 16130	N SECTION
					TYI	PE OF	SUB	MITT	AL	1			1		CLASS FICATION	SI- ION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	ACTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAWINGS	I N S T R U C T I O N S	8 C H E D U L E 8	S T A T E M P O R T S S		S	RECORDS	O & M M A N U A L S	N F O R M A T	О	/ A E P R P N R	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 1.4	e. Raceway and Boxes	f.	g. x	h.	i.	j. k.	l.	m.	n.	0.			q. G	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			1.4	Raceway and boxes	X	X										G	AK									
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TITL	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	. Mi	ddle	Schoo	ol						(CONT	RACTOR	2						CIFICATIO 16139	N SECTION
					TYI	PE OF	SUB	MITT	AL						CLASSI FICATIO	I- DN			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	I N S T R U C T I O N S	\emptyset \square \square \square \square \square \square \square \square \square	S T A T E M P O O R T S S	C E R T I F I C A T E S	s	R E C O R D S	O & M M A N U A L S	N F C R M A T I C	V E R N T O M E	A P P R	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 1.5	e. Cable Tray	f.		h.	i.	j. k.	I.	m.	. n.	0.			q. G	r. AE	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			1.5	Cable Tray		^				^				+		G	AE									
				Coordination Drawings		Х										G	ΑE									
				Test Reports					Х					Х												
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TITL	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	Scho	ol &	Mic	ddle	Schoo	ol						CONT	RACTOF	R						CIFICATIO 6140	N SECTION
					TYF	PE OF	SUB	MITT	AL	1		1	1	F	CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - Z G S	- z s - z - o o z s	SCHEDULES	S T A T E P P O R T T S S	CERTIFICATES	S	R E C O R D S	O & M M A N U A L S	N F O R M A T I	GOVERROVED ONLY	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.		o. q.	r.	s.	t.	u.	V.	W.	X.	у.	Z.	aa.
				Receptacles	X									X											
				Pendent Cord/Connectors	Χ									X											
			2.4	Cord & Plug Sets	X									Х											
				Switches	Х									X											
				Wall Plates	X									X											
			2.7	Floor Service Fitting	X									X											
				Poke-Thru Floor Outlets	Х									X											
				Multioutlet Assemblies	Х									X											
			2.10	Finishes	Х										G	ΑE									
																					<u> </u>				

								Sl	JBMIT (E	TA				ER	?									ITRACT NO DACA 31-0	
TITL	E AND	LOC	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	Scho	ol &	: Mi	ddle				•				CON	TRACTOF	?						CIFICATIO 16215	N SECTION
					TYF	PE OF	SUE	ВМІТТ	AL						CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RGS	I N S T R U C T - O N S	SCHEDULES	S T A T E M E N T S	C E R T I F I C A T E S	s	R E C O R D S	O & M M A N U A L S	N F O R M A T I	V A E P R P N R O M O	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 1.4	e. Power Monitoring System	f.	g.	h.	i.	j. k.	I.	m.	n. X	O.	1	p. q. G	r. AE	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			1.4	rower monitoring system	^	^	^		^	^		^	^			AL									
																									
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TITL	E AND I	LOC	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle				·				(CONT	RACTOR	2						CIFICATIO 1 6231	N SECTION
					TYF	PE OF	SUB	BMITT	AL				1		CLASSI- FICATIO	- N		;	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR 4 8 - Z G %	I N S T R U C T I O N S	S C H E D U L E S	S T A T E M E N T S	C E R T I C A T E S	S	R E C O R D S	O & M A N U A L S	N F N A	O V R E	A P P R O V E D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 1.4	e. Packaged Engine Generator	f.		h. X		j. k X X		m	. n.	o.		р. q G		r. 4E	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			1.4	rackaged Engine Generator	^	^	^		^ ^	^		^	^		- 6		<u> </u>									
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TITI	E AND 1	LOCA	ATION Bell/	Lincoln Multicultural High hington, D.C.	Scho	ol &	z Mi	ddle				•				COI	NTF	RACTOR	}					SPE	CIFICATIO	N SECTION
	<u> </u>	I	vv as	imigion, D.C.	ITVI	DE OE	CITE	MITTA	\I					I (CLASSI-				CONTRACTO	7 P	1	CONTRA	CTOP	162	89 VERNMENT	
						T	T	1						FI	ICATION		-	S	SCHEDULE DA	ATES		ACTI	ON T	- 00	ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	I N S T R U C T I O N S	SCHEDULES	S T A T E E P O R T S S	CERTIFICATES	S A M P L E S	RECORDS	O & M M A N U A L S	M A T	R F N F O M C N E V	P E V V I O E W E E	, ,	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	l.			0.	p.		r.		S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			1.3	Transient Voltage Suppression	X	Х	Х		X	X		X	X		G	AE										
				•																						
																										
																										
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								SL	JBMI [*]	TTA ER 4				ER	₹								CON	ITRACT NO DACA 31-0). 0-D-0039
TITL	E AND I	LOCA	ATION Bell/	Lincoln Multicultural High S hington, D.C.	Scho	ol &	Mi	ddle				<u> </u>				CONT	RACTOR	2					SPE	CIFICATIO	N SECTION
			was	illington, D.C.																			163	40	
					TYF	PE OF	SUB	BMITT	AL						CLASSI- FICATION			CONTRACTO	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NG%	INSTRUCTIONS	0 H L C D H L O 0	S T A T E E E M F E N T S S	C E R T I F I C A T E S	S	R E C O R D S	O & M M A N U A L S	N F O R M A T I	O V A E P R P N R O M O	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k	. I.	m	. n.	0.		p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
				Switchgear	X	Х								X											
			2.4	Components		Χ								X											
				Circuit Breakers	Х	Х								X											
			2.6	Fuse Cabinet	Х	Х								X											
						1	<u> </u>			+		+						1							
							1						1	+											
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TITL	E AND	LOCA	ATION Bell/	Lincoln Multicultural High S hington, D.C.	Scho	ol &	. Mi	ddle								CON	TRACTOF	3					SPE	CIFICATIO	N SECTION
		1	vv as.	inligion, D.C.										1						ı			164		
					TYI	PE OF	SUE	MITT/	AL	1	<u> </u>			ı	CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES T		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	I N S T R U C T - O N S	SCHEDULES	S T A T E E P O N T T S S	CERTIFICATES	Λ.	RECORDS	O & M M A N U A L S	N F O R M A T I	O V A E P R P N R O M O	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.		h.	i.	j. k.	I.	m.	n.	0.	ŗ	p. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			1.4	Submittals	Х	X								-	G	AE									
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TITL	E AND I	LOCA	ATION Bell/	Lincoln Multicultural High hington, D.C.	Scho	ol &	z Mi	ddle	Scho	ol						CC	NTI	RACTOR	(SPE	CIFICATIO	N SECTION
			w as	limgton, D.C.	TYI	PE OF	SUE	BMITT/	AL.					1	CLASSI-				CONTRACTO	OR		CONTRA	CTOR	164 GO	VERNMENT	Π
					-										FICATION			;	SCHEDULE DA	TES		ACTI	ON		ACTION	
A C T - V - T Y NO	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	- N S T R U C T - O N S	SCHEDULES	S T A T E E M P E O R T T S S	C E R T I F I C A T E S	S	R E C O R D S	O & M A N U A L S	N F O R M A T	F O V A R E	A FP EP V V V V V V E E E E	V 	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.		j. k		m.	n.			p. q.	r		S.	t.	u.	V.	W.	x.	y.	Z.	aa.
			1.4	Transfer Switches	Х	Х	X	1	X X	X		Х	Х	+	G	Α	ĽΕ							-		<u> </u>
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TITL	E AND I	LOCA	ATION Bell/	Lincoln Multicultural High hington, D.C.	Scho	ol &	Mi	ddle	Schoo	ol						CON	TRACTOF	3					SPE	CIFICATIO	N SECTION		
			was	mington, D.C.																			164				
					TYI	PE OF	SUE	BMITTA	\L	ı	ı	ı	1	ı	CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION			
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W - N G S	I N S T R U C T I O N S	С	S T A T R E M P O R T S S	CERTIFICATES	S	RECORDS	O & M M A N U A L S	N F O R M A T I	O V A E P R P	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS		
a.	b.	c.	d.	е.	f.	g.	h.		j. k.		m.	n.		ŗ	p. q.	r.	s.	t.	u.	V.	W.	x.	y.	Z.	aa.		
			1.4	Enclosed Controllers	Х	Х	Х		X	X		X	X		G	AE											
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TI	ΓLE A	AND L	LOCA	ATION Bell/	Lincoln Multicultural High Shington, D.C.	Scho	ol &	z Mi	ddle	Scho	ol		-				CONT	TRACTO	R					SPE	CIFICATIO	N SECTION
				77 43	mington, D.C.																			164		
						TYI	PE OF	SUE	3MITT/	AL		1	1			CLASSI- FICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO\	/ERNMENT ACTION	
A C T I V I T Y N O	TR MI	RANS- ITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	G	- N S T R U C T - O N S	SCHEDULES	S T A T E E M P C R T S S	CERTIFICATES	S	R E C O R D S	O & M M A N U A L S	N F O R M A T I	O V A E P R P	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
а		b.	C.	d.	e.	f.		h.		j. k	. l.	m.	n.	0.	L	p. q.	r.	S.	t.	u.	٧.	W.	X.	y.	Z.	aa.
				1.4	Switchboards	Х	Х	X	+ + +	X X	X		X	Х		G	AE									
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 16442 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N D R A W ATEMENTS R Ε S A M P L E S SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS N G S 0 W N O N S E S E S N T 0 D D Ο. S N Y D Ε Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. s. u. ٧. W. х. aa. Z. 1.4 **Panelboards** \mathbf{X} G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 16443 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N D R A W ATEMENTS R R E P Ε S A M P L E S SUBMIT R E C O R D S TRANS-**SPECIFICATI** V APPROVAL MATERIAL TO Р Е MITTAL **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-O R T S M E М PARAGRAPH ITEM SUBMITTED C O C 0 NO. U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS NUMBER N G S 0 W N O N S E S E S N T Ν 0 Ε D D Ο. S N Y D Ε Ε d. k. n. b. C. e. g. h. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 1.4 **Motor Control Center** \mathbf{X} G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 16461 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS R E P S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS N G S 0 W N O N S E S E S N T 0 D D Ο. S N Y D Е Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. s. u. ٧. W. х. z. aa. **Dry Type Transformer** 1.3 \mathbf{X} G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) Bell/Lincoln Multicultural High School & Middle School CONTRACTOR SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 16491 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N D R A W ATEMENTS R R E P Ε S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Р MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** D С A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O DATE C 0 U Ε BY MENT 0 SUBMIT BY DATE REMARKS N G S 0 W N O N S E S N T Ε 0 Ε D D Ο. S S N Y D Ε Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 1.3 **Fuses** G ΑE

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 16511 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS R E P S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε **SUBMIT** BY DATE MENT 0 BY DATE REMARKS N G S 0 W N O N S E S E S N T 0 Ε D D Ο. S N Y D Ε Ε d. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 1.4 Interior Lighting G ΑE

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TITI	LE AND	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle	Scho	ool						C	CONT	RACTOR	R					165		N SECTION
					TYP	PE OF	SUE	BMITT	AL						CLASS	SI- ON			CONTRACTO SCHEDULE DA	OR ITES		CONTRA ACTI	CTOR ON	GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	S H L C O H L S S	S T A T E M E N T S	C E F T I I I I I I I I I I I I I I I I I I	: 5	R E C O R D S	8 N	И F И F А М И -	I	A P P R O V E D	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.					n. n.	. 0).		q.	r.	S.	t.	u.	٧.	W.	X.	y.	Z.	aa.
		1	1.4	SPORTSLIGHTING SYSTEM	X	Х		Х		XX			Х		X	G	AE									
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TITI	LE AND	LOCA	ATION Bell/ Was	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle	Scho	ol						CONT	RACTOF	8					165		N SECTION
					TYF	PE OF	SUB	MITTA	AL	1		1		F	CLASSI- ICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GOV	/ERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	SCHEDULES	S T A T E E P P C N T S S	C E R T I C A T E S	S	R E C O R D S	O & M M A N U A L S	N F O R M A T I	GOVERNMENT ONLY	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d. 1.3	e. FLOODLIGHTS AND	f.	g. X	h.	i.	j. k		m	. n.	0. X	р	. q. G	r. AE	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
		<u> </u>		PHOTOCELL RELAYS					^^	`															
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR Bell/Lincoln Multicultural High School & Middle School SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 16570 CLASSI-CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL CONTRACTOR SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C S T G O S & S M V E R N R R E D R A W ATEMENTS R E C Μ S A M P L E S Ρ SUBMIT R E P O R T S E D TRANS-SPECIFICATION l C APPROVAL MATERIAL TO Ρ Α Ε PARAGRAPH Τ MITTAL **DESCRIPTION OF** Ν NEEDED NEEDED GOVERN-A T O R D S A O T N M E M NUMBER ITEM SUBMITTED U C O NO. Ε BY DATE MENT С 0 **SUBMIT** BY DATE REMARKS A T A N G S 0 Α W 0 N O N S E S E S N T Ν D D Ο. S O Y D Е Е d. h. k. n. a. b. C. e. g. m. Ο. p. q. r. S. u. ٧. W. Х. Z. aa. х х 2.3 Rigging Components Motorized Lineshaft Rigging X X 2.4 X х х 3.2 **Control Console** X 3.3 х х **House Light Controls** X х х 3.4 **Dimmers** Χ X **Distribution AMP Specs** х х 3.5 X х х 3.6 Stage Lighting Fixtures Χ X

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 16580 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N D R A W ATEMENTS R R E P Ε S A M P L E S SUBMIT R E C O R D S SPECIFICATION TRANS-APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С A T NEEDED NEEDED GOVERN-O R T S M E NO. M NUMBER ITEM SUBMITTED C O C 0 U Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS N G S 0 W N O N S E S E S N T 0 Ε D D Ο. S N Y D Ε Ε d. k. n. a. b. C. e. g. h. m. 0. p. q. r. s. u. ٧. W. х. z. aa. 1.3 \mathbf{X} G ΑE Theater

CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) CONTRACTOR SPECIFICATION SECTION Bell/Lincoln Multicultural High School & Middle School TITLE AND LOCATION Washington, D.C. 16726 TYPE OF SUBMITTAL CLASSI-CONTRACTOR SCHEDULE DATES CONTRACTOR GOVERNMENT **FICATION ACTION ACTION** C E A C T 0 Ν S T G O S & N M V E R N R E D R A W ATEMENTS S A M P L E S M SUBMIT R E P O R T S R E C O R D S SPECIFICATION TRANS-V APPROVAL MATERIAL TO Ρ MITTAL Ε PARAGRAPH Τ **DESCRIPTION OF** С Ν A T NEEDED NEEDED GOVERN-M E NO. M NUMBER ITEM SUBMITTED U C O C 0 Ε BY DATE MENT 0 SUBMIT BY DATE REMARKS O N S N G S W N O E S E S N T Ν 0 D D Ο. S N Y D Ε Ε d. h. k. n. a. b. C. e. g. m. 0. p. q. r. s. u. ٧. W. х. у. z. aa. ΑE 1.5 **Public Address & Music** System

								SU	IBMIT	Γ ΤΑ ER 4′				ER										TRACT NO	
TITI	LE AND	LOCA	ATION Bell/	Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle				,				CONT	FRACTOR	R EDUCAT	IONAL SYST	ГЕМЅ	PLANNIN	IG	SPE	CIFICATIO	N SECTION
			was	illington, D.C.	TYF	E OF	SUB	MITT	AL					C	_ASSI-			CONTRACTO	OR ATES		CONTRA ACTI	CTOR ON	170 GO	90 VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR AW INGS	INSTRUCTIONS	SCHEDULES	S T A T E E M P O R T T S S	C E R T I F I C A T E S	Α	RECORDS	O & M M A N U A L S	I N F O R M A T	G O V A E P R P N R O M O V	E V I E W E	SUBMIT	APPROVAL NEEDED	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.		m.	n.		p.		r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			17090, A.2	Cables	X	X	X			Х			X		G	A/E									
			17090, A.4	As-Built Drawings		Х																			
			17090, A.2	Patch Panels	X					X					G	A/E									
			·																						
			17090, A.2	Face Plates	Х					Χ					G	A/E									
			17090, A.2	Jacks	Х					X					G	A/E									
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TITL	E AND 1	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	Mi	ddle									CON	NTR	ACTOR	R EDUCATI	ONAL SYST	EMS	PLANNIN	G		CIFICATIO 100	N SECTION
					TYI	PE OF	SUB	BMITT	AL						CLA FICA	SSI- TION			(CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTIO	CTOR ON	GC	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	I N S T R U C T I O N S	0 U H D D U H 0	S T A T E M P O R T T S S	CERTIFICATES	S A M P L	R E C O R D S	8 N A 1	M N N N N N N N N N N N N N N N N N N N	N F O R M A T O Z L Y	GOVAER FOR FOR FOR FOR FOR FOR FOR FOR FOR FO	E V V I D E W E E		SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	СОDЕ	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e. Backbone and horizontal	f.	g. X	h.	i.	j. k	. I.	m	. n.	. c).	p.	q.	r. A/E		s.	t.	u.	٧.	W.	X.	y.	Z.	aa.
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CONTRACT NO. **SUBMITTAL REGISTER** DACA 31-00-D-0039 (ER 415-1-10) Bell/Lincoln Multicultural High School & Middle School CONTRACTOR EDUCATIONAL SYSTEMS PLANNING SPECIFICATION SECTION TITLE AND LOCATION Washington, D.C. 17110 CLASSI-CONTRACTOR GOVERNMENT TYPE OF SUBMITTAL CONTRACTOR SCHEDULE DATES **FICATION ACTION ACTION** C E 0 Ν C T S T S & N G M 0 V E D R A W ATEMENTS R S A M P L E S M Ε SUBMIT E P E TRANS-SPECIFICATION R V TO Р **APPROVAL** MATERIAL PARAGRAPH **DESCRIPTION OF** Τ MITTAL Ε С Ν A T Ν NEEDED NEEDED GOVERN-O R T S O R D S M NUMBER ITEM SUBMITTED M E NO. Ε BY С DATE MENT С 0 SUBMIT BY DATE REMARKS N G S 0 W 0 0 N O E S N T Ν Ν Ε 0 Ε D D Ο. S S S N Y D Е Ε h. a. b. C. g. m. n. 0. p. q. r. s. u. ٧. W. Х. Z. aa. 17110, 1.2 Uninterrupted Power Supply **Fiber Optic Termination** 17110, 2.1 Χ 17110, 2.1 C UTP Data Cable Termination 17110, 2.1 D UTP Voice CableTermination X 17110, 2.1 E | Equipment Racks

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[ITL]	E AND I	LOCA	ATION Bell/ Was	Lincoln Multicultural High hington, D.C.	Scho	ol &	Mi	ddle	Schoo	ol		-				CONT	TRACTOF	R EDUCATI	ONAL SYST	ΓEMS	PLANNIN	IG			N SECTION
			11 45.	imigeon, D.C.	TYI	PE OF	SUB	MITTA	L					C	LASSI- CATION			CONTRACTO	DR ATES		CONTRA ACTI	CTOR ON	171 GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M NO.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	N G	I N S T R U C T I O N S	C H	STATTEMENTS	CERTIFICATES	Δ	RECORDS	O & M M A N U A L S	I N F O R M A T I	G O V A E P R P R P R O M O V E V	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	C O D E	DATE	REMARKS
a.	b.	c.	d. 17130, 2.1	e. Equipment Racks	f.	g.	h.	i.	j. k.	l.	m.	n.	0.	р. Х	q.	r.	S.	t.	u.	V.	W.	X.	у.	Z.	aa.
			17 130, 2.1	Equipment Racks	^									^											
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TITL	E AND I	LOCA		Lincoln Multicultural High S hington, D.C.	cho	ol &	Mi	ddle	Schoo	ol						CONT	RACTOR	R EDUCATI	ONAL SYST	EMS	PLANNIN	IG			N SECTION
			,,,,,		ı									1			_						171		
					TYF	PE OF	SUB	MITT	AL					F	CLASSI- ICATION			CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI		GO'	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DR AW - NG %	- Z O - + O C A + O Z O	SCHEDULES	S T A T E E P O R T S	CERTIFICATES		RECORDS	O & M M A N U A L S	N F O R M A T I	G O V E P P N R O V E N T D	R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	0.	р	o. q.	r.	S.	t.	u.	V.	W.	x.	y.	Z.	aa.
			17150, 2.1	Multi Mode Fiber Optic Cable										Χ											
			17150, 2.2	Single Mode Fiber Cable	Х									Х											
				UTP Voice Cable	Х									Х											
			17150, 2.4	Video Trunk Cable	Х									X											
			17150, 2.5	Inner Duct	Х									Χ											
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TITL	E AND I	LOCA	ATION Bell/ Wasl	Lincoln Multicultural High S hington, D.C.	cho	ol &	: Mi	ddle	Schoo	ol						CONT	RACTOR	R EDUCATI	ONAL SYST	EMS	PLANNIN	IG			N SECTION
	r	1	*** u 51	mington, D.C.													1			1			171		
					TYF	PE OF	SUB	MITT	AL			1		F	CLASSI- FICATION		:	CONTRACTO SCHEDULE DA	OR ATES		CONTRA ACTI	CTOR ON	GO	VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-RG%	I N S T R U C T I O N S	\circ C I \sqcup D \cup I \circ	ST AT E M E N T S	CERTIFICATES	SAMPLES	RECORDS	O & M M A N U A L S	N F O R M A T I	O V A E P R P	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.		h.	i.	j. k.	I.	m.	n.	o.		o. q.	r.	S.	t.	u.	V.	W.	X.	y.	Z.	aa.
			17160, 2.1	Horizontal UTP Cable	X										X										ļ
			17160, 2.2	Horizontal Video Cable	Х									,	X										
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				8,	TYF	PE OF	SUB	MITTA	L	1		1		(F	CLASSI- CATION			CONTRACTO	OR ATES		CONTRA ACTIO	CTOR ON	172	10 VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	DRAW-NGS	- N S F R U C F - O Z S	S C H E D U L E	STATE PORTS	CERTIFICATES	SA	RECORDS	O & M M A N U A L S	N F O R M A T	GO > E R N M E N H	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	C O D E	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	C.	d.	e.	f.	g.	h.	i.	j. k.	I.	m.	n.	О.		q.	r.	S.	t.	u.	V.	W.	x.	у.	Z.	aa.
				Chassis Switch	Х									X											
				Stackable Switches	X									X											
				Routers	X									X											
				Wireless Network Access Points	Х									X											
					-						-											1			
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					TYF	E OF	SUB	MITT	AL .		1			F	CLASSI-	N			CONTRACTO SCHEDULE DA			CONTRA ACTI			VERNMENT ACTION	
A C T I V I T Y N O	TRANS- MITTAL NO.	I T E M N O.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	D A T A	D R A W I N G S	- Z O O C A - O Z O	\circ C H \circ D U L \circ	S T A T E M P O O R T T S S	CERTIFICATES	S A M	R E C O R D S	O & M M A N U A L S	N F O R M A T	GOVERNMENT ONLY	A P P R O V E D	R E V I E W E R	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	СОДЕ	DATE	SUBMIT TO GOVERN- MENT	CODE	DATE	REMARKS
a.	b.	c.	d.	e.	f.	g.	h.	i.	j. k.	. I.	m.	. n.	О.	р). q		r.	S.	t.	u.	V.	W.	x.	у.	Z.	aa.
				Submittals -Taps	X									X												1
			17400, 1.3	Submittals -Traps and Filters	Х									Х												1
			17400, 1.3	Submittals- Splitters	Х									Χ												· I
			17400, 1.3	Submittals -Amplifiers	Х									Х												· I
			17400, 1.3	Submittals -Modulators	Х									Х												· I
			17400, 1.3	Submittals -Diplex Filters	Х									Х												
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SECTION 07841- THROUGH-PENETRATION FIRESTOP SYSTEMS PART 1 - GENERAL RELATED DOCUMENTS Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. **SUMMARY** This Section includes firestopping for the following: ADJUST LIST BELOW TO SUIT PROJECT. DELETE KINDS OF CONSTRUCTION AND PENETRATING ITEMS WITHIN EACH SUBPARA NOT APPLICABLE TO PROJECT. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items. Sealant joints in fire-resistance-rated construction. Related Sections: The following Sections contain requirements that relate to this Section: Division 3 Section "Cast-In-Place Concrete" for construction of openings in concrete slabs. Division 4 Section "Unit Masonry" for joint fillers for non-fire-resistive-rated masonry construction. Division 7 Section "Building Insulation" for safing insulation and accessories. Division 7 Section "Joint Sealants" for non-fire-resistive-rated joint sealants. Division 15 Sections specifying ducts and piping penetrations. Division 16 Sections specifying cable and conduit penetrations.

SYSTEM PERFORMANCE REQUIREMENTS

 General: Provide firestopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

F-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

T-Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupiable floor areas. T-rated assemblies are required where the following conditions exist:

Where firestop systems protect penetrations located outside of wall cavities.

Where firestop systems protect penetrations located outside fire-resistive shaft enclosures.

Where firestop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.

 Where firestop systems protect penetrating items larger than a 4 inch (100 mm) diameter nominal pipe or 16 sq. in. (100 sq. cm) in overall cross-sectional area.

Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per ASTM E 119, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.

For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

For floor penetrations with annular spaces exceeding 4 inches (100 mm) or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.

For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450, as determined per ASTM E 84.

SUBMITTALS

General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

Product data for each type of product specified.

Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.

Shop drawings detailing materials, installation methods, and relationships to adjoining construction for each throughpenetration firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspecting agency evidencing compliance with requirements for each condition indicated.

Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop configuration for construction and penetrating items.

Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration approved by firestopping manufacturer's fire protection engineer with modifications marked.

Product certificates signed by manufacturers of firestopping products certifying that their products comply with specified requirements.

Product test reports from, and based on tests performed by, a qualified testing and inspecting agency evidencing compliance of firestopping with requirements based on comprehensive testing of current products.

Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of "Contracting Officer Representative"s and Government, and other information specified.

QUALITY ASSURANCE

testing and inspecting agency.

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Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems that is acceptable to authorities having jurisdiction.

Fire-Test-Response Characteristics: Provide firestopping that complies with the following requirements and those

Through-penetration firestop systems are identical to those tested per ASTM E 814 under conditions where positive furnace pressure differential of at least 0.01 inch of water (2.5 Pa) is maintained at a distance of 0.78 inch (20 mm) below the fill materials surrounding the penetrating items in the test assembly. Provide rated systems complying with the following requirements:

Through-penetration firestop system products bear

classification marking of qualified testing and inspecting agency.

specified under the "System Performance Requirements" article:

Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by UL in their "Fire Resistance Directory," by Warnock Hersey, or by another qualified testing and inspecting agency.

Fire-resistive joint sealant systems are identical to those tested for fire-response characteristics per ASTM E 119 under conditions where the positive furnace pressure differential is at least 0.01 inch of water (2.5 Pa), as measured 0.78 inch (20 mm) from the face exposed to furnace fire. Provide systems complying with the following requirements:

Fire-Resistance Ratings of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory" or by another qualified

Joint sealants, including backing materials, bear

classification marking of qualified testing and inspection agency.

Information on drawings referring to specific design designations of through-penetration firestop systems is intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the "Contracting Officer Representative" s prior approval. Submit documentation showing that the performance of proposed substitutions equals or exceeds that of the systems they would replace and are acceptable to authorities having jurisdiction.

Installer Qualifications: Engage an experienced Installer who has completed firestopping that is similar in material, design, and extent to that indicated for Project and that has performed successfully.

Single-Source Responsibility: Obtain through-penetration firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.

Field-Constructed Mockup: Prior to installing firestopping, erect mockups for each different through-penetration firestop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.

Locate mockups on site in locations indicated or, if not indicated, as directed by "Contracting Officer Representative".

Notify "Contracting Officer Representative" 1 week in advance of the dates and times when mockups will be erected.

Obtain "Contracting Officer Representative" s acceptance of mockups before start of final unit of Work.

Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work.

When directed, demolish and remove mockups

Accepted mockups in an undisturbed condition at

from Project site.

time of Substantial Completion may become part of completed unit of Work.

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Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy."

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Coordinating Work: Coordinate construction of openings and penetrating items to ensure that designated throughpenetration firestop systems are installed per specified requirements.

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Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

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A qualified inspection agency shall check installed firestopping systems for compliance with requirements.

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DELIVERY, STORAGE, AND HANDLING

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Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

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Store and handle firestopping materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

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PROJECT CONDITIONS

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Environmental Conditions: Do not install firestopping when ambient or substrate temperatures are outside limits permitted by firestopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

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Ventilation: Ventilate firestopping per firestopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

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SEQUENCING AND SCHEDULING

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Notify inspection agency at least 1 week in advance of firestopping installations; confirm dates and times on days preceding each series of installations.

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Do not cover up those firestopping installations that will become concealed behind other construction until Government' inspection agency and authorities having jurisdiction, if required, have examined each installation.

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PART 2 - PRODUCTS

FIRESTOPPING, GENERAL

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Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.

Accessories: Provide components for each firestopping system that are needed to install fill materials and to comply with "System Performance Requirements" article in Part 1. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire-resistance-rated systems. Accessories include but are not limited to the following items:

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Permanent forming/damming/backing materials including the following:

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Semirefractory fiber (mineral wool) insulation.

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Ceramic fiber.

1 Sealants used in combination with other 2 forming/damming materials to prevent leakage of fill materials in liquid state. 3 4 Fire-rated formboard. 5 6 Joint fillers for joint sealants. 7 8 Temporary forming materials. 9 10 Substrate primers. 11 12 Collars. 13 14 Steel sleeves. 15 16 Applications: Provide firestopping systems composed of materials specified in this Section that comply with system 17 performance and other requirements. 18 19 20 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS 21 22 Ceramic-Fiber and Mastic Coating: Ceramic fibers in bulk form formulated for use with mastic coating, and ceramic 23 fiber manufacturer's mastic coating. 24 25 Ceramic-Fiber Sealant: Single-component formulation of ceramic fibers and inorganic binders. 26 Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation. 27 28 Intumescent, Latex Sealant: Single-component, intumescent, latex formulation. 29 30 Intumescent Putty: Nonhardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone 31 compounds. 32 33 Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum foil on one side. 34 35 Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce 36 a paintable compound, passing ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84. 37 38 Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated 39 for mixing with water at Project site to form a nonshrinking, homogenous mortar. 40 41 Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination 42 of mineral-fiber, water-insoluble expansion agents and fire-retardant additives. 43 44 Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, nonshrinking foam. 45 46 47 Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade 48 indicated below: 49 50 Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag 51 formulation for openings in vertical and other surfaces requiring a nonslumping/ gunnable sealant, unless indicated 52 firestop system limits use to nonsag grade for both opening conditions. 53 54 Solvent-Release-Curing Intumescent Sealant: Solvent-release-curing, single-component, synthetic-polymer-based 55 sealant of grade indicated below: 56 57 Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag

Products: Subject to compliance with requirements, provide one of the following:

firestop system limits use to nonsag grade for both opening conditions.

formulation for openings in vertical and other surfaces requiring a nonslumping/gunnable sealant, unless indicated

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Architects + Engineers

1 2	Ceramic-Fiber and Ma	stic Coating:
3		FireMaster Bulk and FireMaster Mastic, Thermal
4 5	Ceramics.	Firewaster bulk and Firewaster Mastic, Thermal
6		
7	Endothermic, Latex	s Sealant:
8		
9 10	(800-321-7906)	Fyre-Shield, Tremco, Inc. (<u>www.tremcosealants.com</u>)
11	(000-521-7900)	
12	Endothermic, Latex C	compounds:
13		
14	D + + + O + + O + + O + O + O + O + O +	Flame-Safe FS900/FST900 Series, International
15 16	Protective Coatings Corp. (<u>www.flamesafe.com</u>) (800-334-8796)	
17	Intumescent Latex	Sealant:
18		
19		Metacaulk 950, The RectorSeal Corporation.
20	(www.rectorseal.com/firestopping/fp2.htm) (800-231-3345)	
21 22		Fire Barrier CP 25WB + Caulk, 3M Fire Protection
23	Products. (www.3m.com/firestop) (800-328-1687)	File Barrier OF 25WB + Caulk, SWI File Flotection
24	(www.sm.com/mestop)	
25		Tremstop IA, Tremco, Inc. (<u>www.tremcosealants.com</u>)
26	(800-321-7906)	
27	Intumopount Di	
28 29	Intumescent Po	utty.
30		Flame-Safe FSP1000 Putty, International Protective
31	Coatings Corp. (<u>www.flamesafe.com</u>) (800-334-8796)	
32		
33	Draducts / 2 / (C /) (000 200 4007)	Fire Barrier Moldable Putty +, 3M Fire Protection
34 35	Products. (<u>www.3m.com/firestop</u>) (800-328-1687)	
36	Intumescent Wrap	Strips:
37	·	·
38		FS 601 Intumescent Wrap, Hilti Construction
39	Chemicals, Inc. (<u>www.us.hilti.com</u>) (800-879-8000)	
40 41		Fire Barrier FS-195 + Wrap/Strip, 3M Fire Protection
42	Products. (www.3m.com/firestop) (800-328-1687)	The Barner 1 o 100 1 Wrap/Othp, own he i fotocion
43	, (000 000)	
44		Tremstop WS, Tremco, Inc. (<u>www.tremcosealants.com</u>
45) (800-321-7906)	
46 47	Job-Mixed Vinyl Co	ampound:
48	Job-Mixed Viriyi Co	impound.
49		USG Firecode Compound, United States Gypsum
50	Co. (<u>www.usg.com</u>)(800-874-4968)	
51		
52 53	Mortar:	
53 54		KBS-Mortar Seal, International Protective Coatings
55	Corp. (<u>www.flamesafe.com</u>) (800-334-8796)	
56		
57		Tremstop M, Tremco, Inc. (<u>www.tremcosealants.com</u>)
58	(800-321-7906)	
59 60	Pillows/Bag	e.
00	I IIIOW5/Dag	9.

THROUGH-PENETRATION FIRESTOP SYSTEMS

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1 2 3 4	Corp. (<u>www.flamesafe.com</u>) (800-334-8796)	KBS Sealbags, International Protective Coatings
5 6	(800-321-7906)	Tremstop PS, Tremco, Inc. (<u>www.tremcosealants.com</u>)
7	Silicone Foal	ma:
8 9	Silicone Foai	IIIS.
10	D / / D / / D / / D / / D /	Fire Barrier 2001 Silicone ATV Foam, 3M Fire
11 12	Protection Products. (<u>www.3m.com/firestop</u>) (800-328-1687)	
13		Pensil 200 Foam, General Electric Co.
14 15	(<u>www.ge.com/silicones</u>) (800-255-8886)	
16	Silicone Seala	ants:
17 18		2000 Silicone Sealant, 3M Fire Protection Products.
19	(<u>www.3m.com/firestop</u>) (800-328-1687)	2000 Gilleone Gediant, SWY he Frotection Froducts.
20		FC 604 Fireston Coolant Hilti Construction
21 22	Chemicals, Inc. (<u>www.us.hilti.com</u>) (800-879-8000)	FS 601 Firestop Sealant, Hilti Construction
23	,, , ,	
24 25		Metacaulk 835 +, The RectorSeal Corporation.
26		Metacaulk Pipe Collars, The RectorSeal
27 28	Corporation.	
29		Fyre-Sil, Tremco Inc. (<u>www.tremcosealants.com</u>) (800-
30	321-7906)	
31 32		Fyre-Sil S/L, Tremco Inc. (<u>www.tremcosealants.com</u>)
33	(800-321-7906)	yio on o, z, riomoo mo. (www.nemesseatans.com)
34 35		
36	FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS	
37	Floritaria de Carlest Otan danda Davida manufacturada etca da	d also as to all the control of the
38 39	Elastomeric Sealant Standard: Provide manufacturer's standard polymer indicated that complies with ASTM C 920 requirements,	
40	and Uses, and requirements specified in this Section applicable	•
41 42	Sealant Colors: Provide color of exposed joint sealants to complete	ly with the following:
43		
44 45	Provide selections made by "Contracting Officer Representative products of type indicated.	e" from manufacturer's full range of standard colors for
46	products of type indicated.	
47 48	Single-Component, Neutral-Curing Silicone Sealant: Type S; Gr	
48 49	joint-substrate-related Uses M, G, A, and (as applicable to joint s	substrates indicated) O.
50	Additional Movement Capability: Provide sealant with the capal	
51 52	joint width existing at time of installation, when tested for adhesic per ASTM C 719, and remain in compliance with other requirements.	
53		50 managet management in both systemsian and
54 55	compression for a total of 100 percent movement.	50 percent movement in both extension and
56	•	400
57 58	movement in compression for a total of 150 percent movement.	100 percent movement in extension and 50 percent
59		

Multicomponent, Nonsag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-1 2 substrate-related Uses M, A, and (as applicable to joint substrates indicated) O. 3 4 Additional Movement Capability: Provide sealant with the capability to withstand the following percentage change in 5 joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated: 6 7 8 40 percent movement in extension and 25 percent 9 in compression for a total of 65 percent movement. 10 11 50 percent movement in both extension and 12 compression for a total of 100 percent movement. 13 14 Single-Component, Nonsag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O. 15 16 17 Products: Subject to compliance with requirements, provide one of the following: 18 19 Single-Component, Neutral-Curing, Silicone Sealant: 20 Dow Corning 790, Dow Corning Corp. 21 22 23 Dow Corning 795, Dow Corning Corp. 24 25 Silpruf SCS 2000, General Electric Co. 26 27 Ultraglaze SSG 4000, General Electric Co. 28 29 864, Pecora Corp. 30 31 Fyre-Sil, Tremco, Inc. 32 33 Multicomponent, Nonsag, Urethane Sealant: 34 35 Vulkem 922, Mameco International Inc. 36 37 Dynflex, Pecora Corp. 38 39 Dynatred, Pecora Corp. 40 41 Dynatrol II, Pecora Corp. 42 Sikaflex 2cn NS, Sika Corp. 43 44 Sonolastic NP 2, Sonneborn Building Products Div. 45 46 of ChemRex Inc. 47 48 Dymeric, Tremco Inc. 49 50 Single-Component, Nonsag, Urethane Sealant: 51 52 Isoflex 880 GB, Harry S. Peterson Co., Inc. 53 54 Isoflex 881, Harry S. Peterson Co., Inc. 55 56 Vulkem 921, Mameco International Inc. 57 Sikaflex--15LM, Sika Corp. 58 59

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For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

EXAMINATION

Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

PREPARATION

Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:

Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.

Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.

Remove laitance and form release agents from concrete.

Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing firestopping's seal with substrates.

INSTALLING THROUGH-PENETRATION FIRESTOPS

General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross-sectional shapes and depths required to achieve fire ratings of designated through-penetration firestop systems. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.

Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:

 $Completely \ fill\ voids\ and\ cavities\ formed\ by\ openings,\ forming\ materials,\ accessories,\ and\ penetrating\ items.$

Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

INSTALLING FIRE-RESISTIVE JOINT SEALANTS

General: Comply with the "System Performance Requirements" article in Part 1, with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.

Install joint fillers to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.

Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.

Tool nonsag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire-resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

FIELD QUALITY CONTROL

Inspecting agency shall examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.

Inspecting agency will report observations promptly and in writing to Contractor and "Contracting Officer Representative".

Do not proceed to enclose firestopping with other construction until reports of examinations are issued.

Where deficiencies are found, repair or replace firestopping so that it complies with requirements.

CLEANING

Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.

Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to produce firestopping complying with specified requirements.

END OF SECTION 07841

1600619 1 SECTION 10425 - SIGNS 2 3 4 PART 1 - GENERAL 5 6 7 RELATED DOCUMENTS 8 9 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification 10 Sections, apply to this Section. 11 12 13 **SUMMARY** 14 15 This Section includes the following types of signs: 16 17 Interior room identification signs. 18 Dedication plaques. 19 20 Related Sections: The following Sections contain requirements that relate to this Section: 21 22 Division 1 Section "Temporary Facilities" for temporary project identification signs. 23 Division 10 Section "Exterior Post and Panel Signs" for freestanding exterior signs. 24 Division 14 Section "Electric Traction Elevators" for elevator door jamb markings. 25 Division 15 Section "Mechanical Identification" for labels, tags, and nameplates for mechanical equipment. Division 16 Section "Electrical Identification" for labels, tags, and nameplates for electrical equipment. 26 27 Division 16 Section "Interior Lighting" for illuminated exit signs. 28 29 30 **SUBMITTALS** 31 32 General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections. 33 34 Product data for each type of sign specified, including details of construction relative to materials, dimensions of individual 35 components, profiles, and finishes. 36 37 Shop drawings showing fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, layout, reinforcement, accessories, and installation details. 38 39 Provide message list for each sign required, including large-scale details of wording and lettering layout. 41 42 For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for 43

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installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.

44 45

Templates: Furnish full-size spacing templates for individually mounted dimensional letters and numbers.

46 47

Furnish full-size rubbings for metal plaques.

48 49 50

Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.

51 52

Samples for verification of color, pattern, and texture selected and compliance with requirements indicated:

53 54 55

56

Cast Acrylic Sheet and Plastic Laminate: Provide a sample panel not less than 8-1/2 inches by 11 inches for each material, color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.

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Dimensional Letters: Provide full-size representative samples of each dimensional letter type required, showing letter style, color, and material finish and method of attachment.

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QUALITY ASSURANCE

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Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the

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Single-Source Responsibility: For each separate sign type required, obtain signs from one source of a single manufacturer.

11 12 13

Design Concept: The Drawings indicate sizes, profiles, and dimensional requirements of signs and are based on the specific types and models indicated. Sign units by other manufacturers may be considered provided deviations in dimensions and profiles do not change the design concept as judged by the Contracting Officer Representative. The burden of proof of equality is on the proposer.

15 16 17

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Signage shall be provided to conform with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and State and Local Regulations. These requirements supersede Technical Specifications in this Section.

18 19 20

PROJECT CONDITIONS

21 22 23

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

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PART 2 - PRODUCTS

27 28 29

MANUFACTURERS

30 31 32

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

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Manufacturers of Panel Signs:

36 37

> 38 39

> 40 41

> 42 43

> 44

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51 52 ABC Architectural Signing System.

Allenite. 1-800-825-0150 www.allenitesigns.com

Andco Industries Corp. 1-800.476.8900 www.andco.com

APCO Graphics, Inc. 404-688-9000 www.apcoline.com/apcohome.html

ASI Sign Systems, Inc. 817.399.1303 www.asisign.com

Best Manufacturing Company. . 1-800-235-2378 www.bestsigns.com/home.html

Charleston Industries, Inc. 1-800-722-0209 www.cisigns.com

DGS Corp. 773-283-4411

Diskey Sign Corp. 219-424-0233 www.diskeysign.com

Environmental Graphic Systems, Inc. 847-981-8525 www.egs-signs.com

Modulex. 214 352 9140 www.modulex.com

Mohawk Sign Systems. 518-370-3433 www.mohawksign.com

Poblocki & Sons, Inc. 414-453-4010 www.poblocki.com/home.html

Spanjer Brothers, Inc.

The Supersine Company. 313-892-6200

Vomar Products, Inc. 818-786-8085 <u>www.vomarproducts.com/index.html</u>

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Manufacturers of Dedication Plaques:

Andco Industries Corp. 1-800.476.8900 www.andco.com

A.R.K. Ramos Manufacturing Company, Inc. 1-800-725-7266 www.arkramos.com

ASI Sign Systems, Inc. 817.399.1303 www.asisign.com

SIGNS

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1	Best Manufacturing Company. 1-800-235-2378 www.bestsigns.com/home.html
2	Gemini, Inc. 1-800-538-8377 <u>www.signletters.com</u>
3	Matthews International Corp. 1-800-284-8242 <u>www.matthewsgsd.com</u>
4	Metal Arts. 972-286-3511
5	Metallic Arts, Inc. 1-800-541-3200 <u>www.metallicarts.com</u>
6	OMC Industries, Inc. 1-800-488-4662 <u>www.omc-bronze.com</u>
7	The Southwell Company. 1-800-950-8068
8	Spanjer Brothers, Inc.
9	Vomar Products, Inc. 818-786-8085 www.vomarproducts.com/index.html
10	
11	
12	
13	
14	
15	
16	<u>MATERIALS</u>
17	
18	
19	Aluminum Castings: Provide aluminum castings of alloy and temper recommended by the sign manufacturer for the casting
20	process used and for the use and finish indicated.
21	
22	Fasteners: Use concealed fasteners fabricated from metals that are not corrosive to the sign material and mounting surface.
23	
24	Anchors and Inserts: Use nonferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere
25	as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts,
26	as required, to be set into concrete or masonry work.
27	
28	DEDICATION DI AQUES
29 30	DEDICATION PLAQUES
31	Dedication plaques shall be 1/4" thick, cast 3003-H14 (ASTM B209) aluminum tablet.
32	Copy shall be 1/2" minimum high raised letters. Style shall be "Helvetica Medium, uppers and lowers" with satin finish, silver
33	color. Background shall be black baked enamel field.
34	color. Background shan oc olack baked chantel field.
35	
36	INTERIOR ROOM IDENTIFICATION SIGNS
37	INTERIOR ROOM IDENTIFICATION SIGNS
38	Signs: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of
39	construction.
40	construction.
41	Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of
42	plus or minus 1/16 inch measured diagonally.
43	plus of minus 1/10 men mensured diagonally.
44	Unframed Signs: Fabricate signs with edges mechanically and smoothly finished to conform with the following requirements:
45	
46	Edge Condition: Beveled.
47	Corner Condition: Radius corners.
48	
49	Laminated Sign Panels: Permanently laminate face panels to backing sheets of material and thickness indicated using the
50	manufacturer's standard process.
51	·
52	Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content,
53	position, material, finishes, and colors of letters, numbers, and other graphic devices.
54	
55	Reverse Engraved Copy (Complying with Handicap Code & ADA Title II): Reverse machine-engraved letters, numbers,
56	symbols, and other graphic devices into sign panel on the face indicated to produce precisely formed copy, incised to uniform

SIGNS 10425 - 3 Architects + Engineers BELL/ LINCOLN MULTICULTURAL HIGH SCHOOL AND MIDDLE SCHOOL

depth. Use high-speed cutters mechanically linked to master templates in a pantographic system or equivalent process capable of producing characters of the style indicated with sharply formed edges.

Engraved Plastic Laminate: Engrave through the exposed face ply of the plastic laminate sheet to expose the contrasting core ply.

Raised Copy Thickness: Not less than 1/32 inch.

Raised Copy Height: Not less than 5/8" nor more than 2".

Braille Characters shall be used in addition to standard alphabet characters and numbers, but not used exclusively. If used, braille characters shall be placed to the left of standard characters.

Quanity, Graphic Content and Style: Provide (1) sign for every room listed on the ROOM FINISH SCHEDULES. Refer to the drawings for typical layout.

FINISHES

Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Contracting Officer Representative from the manufacturer's standards.

Metal Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and applications recommendations. Aluminum Finishes: Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.

Baked-Enamel Finish: AA-M4xC12C42R1x (Mechanical Finish: Manufacturer's standard, other nondirectional textured; Chemical Finish: Chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below). Apply baked enamel in compliance with paint manufacturer's specifications for cleaning, conversion coating, and painting.

Organic Coating: Thermosetting-modified acrylic enamel primer/topcoat system complying with AAMA 603.8 except with a minimum dry film thickness of 1.5 mils, medium gloss.

Color: As selected by the Contracting Officer Representative from the manufacturer's standard colors.

PART 3 - EXECUTION

INSTALLATION

General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.

Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

Wall-Mounted Interior Room Identification Signs: Attach panel signs to wall surfaces using the methods indicated below:

Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.

Silicone-Adhesive Mounting: Use liquid silicone adhesive recommended by the sign manufacturer to attach sign units to irregular, porous, or vinyl-covered surfaces. Use double-sided vinyl tape where recommended by the sign manufacturer to hold the sign in place until the adhesive has fully cured.

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1 Shim Plate Mounting: Provide 1/8-inch-thick concealed aluminum shim plates with predrilled and countersunk holes, at 2 locations indicated, and where other mounting methods are not practicable. Attach the plate with fasteners and anchors 3 suitable for secure attachment to the substrate. Attach sign units to the plate using the method specified above. 4 5 Dedication Plaques: Mount plaques using the standard method recommended by the manufacturer for the type of wall surface 6 indicated. 7 8 Concealed Mounting: Mount the plaques by inserting threaded studs into tapped lugs on the back of the plaque. Set in 9 predrilled holes filled with quick-setting cement. 10 11 12 **CLEANING AND PROTECTION** 13 14 After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until 15 acceptance by the Government. 16 17 18 END OF SECTION 10425

10425 - 5 **SIGNS** Architects + Engineers SECTION 12627 - LIBRARY FURNITURE

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of Contract, included General and Supplementary Conditions and Division-1 Specifications sections, apply to the work of this section.

SUMMARY:

Extent, location and details of library furniture are indicated on drawings and in schedules.

Work in this section includes free-standing furniture items as indicated.

Wood and laminate casegoods are specified elsewhere in a Division-12 Section.

SUBMITTALS:

Product Data: Submit manufacturer's product literature for each type of library furniture item and installation accessory required.

Submit written data on physical characteristics, load bearing capabilities and durability.

Maintenance Data: Include data in Maintenance Manual as specified in Division-1.

Maintenance Instructions: Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition of wood and painted metal surfaces under anticipated use conditions. Include precautions against materials and methods which may be detrimental to finishes and performance.

Shop Drawings: Submit installation drawings showing location extent of library furniture. Indicate location and extent of wiring for manufacturer provided electrical components.

Samples for Verification Purposes: Submit 12" square samples of each wood and paint finish required, prepared from same material to be used for the work.

QUALITY ASSURANCE:

42 Manufacturer's Qualifications: Firm (material producer) with not less than 3 years of production experience, whose published 43 literature clearly indicates general compliance of products with requirements of this section.

Installer's Qualifications: Firm specializing in furniture installation with not less than 2 years of experience in installation similar to those required for this project.

Single Source Responsibility: Provide material produced by a single manufacturer for all free-standing library furniture.

DELIVERY, STORAGE AND HANDLING:

Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, and lot number. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping.

Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

SEQUENCING AND SCHEDULING:

Sequence library furniture installation with other work to minimize possibility of damage and soiling during remainder of construction period.

1 WARRANTY: 2

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This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.

Warranty period is 2 years after the date of substantial completion.

MAINTENANCE:

Replacement Materials: Furnish accessory components as required. Furnish replacement materials from same production run as materials installed. Package replacement materials with protective covering, identified with appropriate labels.

PART 2 - PRODUCTS

MANUFACTURERS:

Manufacturers: Subject to compliance with requirements, provide products of one of the following:

Bretford Manufacturing 800-521-9614 www.bretford.com Buckstaff Company 800-755-5890 www.buckstaff.com Library Bureau 800-221-6638 www.librarybureau.com Tesco Industries 800- 699-5824 www.tesco-ind.com TexWood 512-352-3000 www.texwood.com Tuohy Furniture Corporation 214-747-8282 www.tuohyfurniture.com

Worden Co. 800 748-0561 www.wordencompany.com

MATERIALS:

Lumber Core Stock: Free from imperfections, thoroughly air seasoned stock, kiln-dried to moisture content of 5-7%, sealed top, bottom and exposed edges.

Plywood: Constructed with odd number of plies, all interior plies except core of center ply, occurring in pairs. Plies of each interior pair of same species, thickness and grain direction, placed on opposite sides of core. Grain direction of each ply at right angles to grain of adjacent plies, and edges of panels. All plies free of blisters, wrinkles, laps or other defects.

Particleboard Core Stock: Medium density, complying with ANSI A 208.1, 45 lbs./cu. ft. minimum average modulus of rupture of 2400 psi, minimum average modulus of elasticity of 400,000 psi.

High Pressure Laminate: 0.050" thick, backing sheet not less than 0.020" thick, complying with NEMA-LD3 Standard.

Glue: Water-resistant resin adhesive which retains strength when subjected to thorough wetting and drying.

Exposed Veneers: Plain-sliced, AWI standard A grade, uniform even grain.

MANUFACTURED UNITS:

Provide library furniture items with the following details, in sizes, quantities and configurations as scheduled.

Tops: Minimum 1" thick, 5-ply construction, with 1" x 3" solid hardwood banding, face veneer on exposed surface, plain veneer on underside.

End Panels and Back Panel: Same construction as worksurface top; height and width for sizes scheduled.

Box Drawers: 1/2" solid hardwood sides, dovetailed and glued. 1/4" five ply hardwood bottom, fitted into dado, glued and blocked into place. Equipped with full extension drawer glides, and stops to prevent accidental removal.

Letter File Drawers: 1/2" solid hardwood sides, dovetailed and glued. 1/2" five ply hardwood bottom, fitted into dado, glued and blocked into place. Equipped with full extension file drawer slides, 150 lb. load capability.

Card File Drawers: Injection molded high-impact ABS plastic, with solid wood tray front. Guide rods and lock knobs secured into spring loaded brass locking ferrule. All file drawers interchangeable. Provide standard pull/label holder. Kickbase: 4" rubber base to match rubber wall base specified in Division 9 Section "Resilient Base and Accessories". FINISHES: Wood Finishes: Provide library furniture with wood finish as specified below: Wood finish as selected by Architect from manufacturer's standard and custom premium finishes. Metal Finishes: Provide metal finish complying with ANSI A156.18, as scheduled Chrome: Mirror Polished. Bronze: Antique. Brass: Polished. Stainless Steel: Polished. Plastic Laminate Finish: As selected by Architect from manufacturer's standard and custom matte finishes. PART 3 - EXECUTION PREPARATION: Verify that all library furniture components, including size and finish, are those specified before installing. Verify that all required electrical hook-up provisions are in place prior to installing. INSTALLATION: Install furniture and accessories after finishing operations, including painting, have been completed. Install furniture to comply with final layout drawings in strict compliance with manufacturer's printed instructions. Position units level, plumb; at proper location relative to adjoining units and related work. Adjust accessories to provide visually acceptable installation. FIELD QUALITY CONTROL: Remove and replace components which are chipped, scratched or otherwise damaged, or do not operate smoothly and which do not match adjoining work. Provide new matching units, installed as specified and in manner to eliminate evidence of replacement. CLEANING: Immediately upon completion of furniture installation, clean components and surfaces. Remove surplus materials, rubbish and debris resulting from installation, upon completion of work and leave areas of installation in neat clean condition. PROTECTION: Protect furniture against damage during remainder of construction period. Advise Owner of additional protection needed to ensure that furniture will be without damage or deterioration at time of substantial completion.

END OF SECTION 12627

1 SECTION 13851 - FIRE ALARM

2 PART 1 - GENERAL

3 1.1 **RELATED DOCUMENTS**

4 A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and 5 Division 1 Specification Sections, apply to this Section.

6 1.2 **SUMMARY**

- A. This Section includes fire alarm systems with manual stations, detectors, signal equipment, controls, and 8 devices.
- 9 B. Related Sections include the following:
- 10 1. Division 8 Section "Hardware" for door closers/holders/smoke detectors, electric door locks, and 11 release devices that interface with fire alarm systems.

12 1.3 **DEFINITIONS**

- 13 A. FACP: Fire alarm control panel.
- 14 B. FAA Fire alarm annunciator.
- 15 C. LED: Light-emitting diode.
- Definitions in NFPA 72 1999 EDITION apply to fire alarm terms used in this Section. 16 D.

17 1.4 SYSTEM DESCRIPTION

18 A. General: Non-coded, addressable-analog system with manual and automatic alarm initiation; automatic 19 sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm 20 service only.

21 1.5 **SUBMITTALS**

- 22 A. Product Data: For each type of product indicated.
- 23 B. Shop Drawings: Show details of graphic annunciator.
- 24 25 26 27 28 29 30 1. Wiring Diagrams: Detail wiring and differentiate between manufacturer-installed and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified.
 - 2. Battery: Sizing calculations.
- Device Address List: Coordinate with final system programming.
- System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically 31 initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are 32 not acceptable.

- 1 C. Coordination Drawings: Plans, sections, and elevations drawn to scale and coordinating installation of 2 3 smoke detectors in ducts and access to them. Show the following near each duct smoke provision of detector installation:
 - 1. Size and location of ducts, including lining.
 - 2. Size and location of piping.

- Size and arrangement of structural elements. 3.
- Size and location of duct smoke detector, including air-sampling elements. 4.
- 8 D. Operating Instructions: For mounting at the FACP.
- Product Certificates: Signed by manufacturers of system components certifying that products furnished E. 10 comply with requirements.
- 11 F. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.
- 12 G. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. 13 Comply with NFPA 72 - 1999 EDITION.
- 14 H. Maintenance Data: For fire alarm systems to include in maintenance manuals specified in Division 1. 15 Comply with NFPA 72 - 1999 EDITION.
- 16 Submissions to Authorities Having Jurisdiction: In addition to distribution requirements for Submittals I. 17 specified in Division 1 Section "Submittals," make an identical submission to authorities having jurisdiction. 18 Include copies of annotated Contract Drawings as needed to depict component locations to facilitate 19 review. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of 20 comments from authorities having jurisdiction, submit them to Architect for review.
- 21 Certificate of Completion: Comply with NFPA 72 - 1999 EDITION. J.

22 1.6 **QUALITY ASSURANCE**

- 23 Installer Qualifications: An experienced installer who is an authorized representative of the FACP A. 24 manufacturer for both installation and maintenance of units required for this Project.
- 25 26 Manufacturer Qualifications: A firm experienced in manufacturing systems similar to those indicated for B. this Project and with a record of successful in-service performance.
- 27 C. Source Limitations: Obtain fire alarm system components through one source from a single manufacturer.
- Compliance with Local Requirements: Comply with applicable building code, local ordinances and D. regulations, and requirements of authorities having jurisdiction.
- 30 E. Comply with NFPA 72 - 1999 EDITION.

31 1.7 **EXTRA MATERIALS**

- 32 A. Furnish extra materials described below that match products installed and that are packaged with 33 protective covering for storage and identified with labels describing contents.
- 1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not 35 36 37 less than one unit.
 - 2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than one unit.
- 38 3. Smoke Detectors, Fire Detectors, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than one unit of each type.

- Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than one 1 2 3 4 unit of each type.
 - 5. Printer Ribbons: Six spares.
 - 6. Keys and Tools: One extra set for access to locked and tamperproofed components.

5 PART 2 - PRODUCTS

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6 2.1 **MANUFACTURERS**

- 7 A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 8 9 1. Cerberus Pyrotronics.
 - 2. Edwards Systems Technology; Unit of General Signal.
- 10 Federal Signal Corp.; Commercial Products Group. 3.
 - Fire Lite Alarms, Inc. 4.
- 12 Gamewell Co. (The). 5.
 - 6. Grinnell Fire Protection Systems.
- 14 Honeywell, Inc. 7. 15
 - Notifier; Div. of Pittway Corp. 8.
- 16 9. Silent Knight.
- Simplex Time Recorder Co. 17 10.

18 2.2 FUNCTIONAL DESCRIPTION OF SYSTEM

- 19 Control of System: By the FACP. Α.
- 20 System Supervision: Automatically detect and report open circuits, shorts, and grounds of wiring for B. 21 initiating device, signaling line, and notification-appliance circuits.
- 22 23 24 25 26 C. Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one zone or device are not altered by subsequent alarm, supervisory, or trouble signals. An alarm signal is the highest priority. Supervisory and trouble signals have second- and third-level priority. Higher-priority signals take precedence over signals of lower priority, even when the lower-priority condition occurs first. Annunciate and display all alarm, supervisory, and trouble signals regardless of priority or order received.
- 27 D. Noninterference: A signal on one zone shall not prevent the receipt of signals from other zones.
- 28 29 E. System Reset: All zones are manually re-settable from the FACP after initiating devices are restored to normal.
- 30 F. Transmission to Remote Alarm Receiving Station: Automatically route alarm, supervisory, and trouble 31 signals to a remote alarm station by means of a digital alarm communicator transmitter and telephone lines.
- G. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevent 34 alarm capability reduction when an open circuit, ground or wire-to-wire short occurs, or an open circuit and 35 a ground occur at the same time in an initiating device circuit, signal line circuit, or notification-appliance circuit.
- 37 H. Loss of primary power at the FACP initiates a trouble signal at the FACP. The FACP indicates when the 38 fire alarm system is operating on the secondary power supply.
- Ι. Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, 40 automatic alarm operation of a flame or heat detector, operation of a sprinkler flow device, or verified 41 automatic alarm operation of a smoke detector initiates the following:

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Notification-appliance operation.

- 1 2 3 4 5 6 7 2. Identification at the FACP and the remote annunciator of the device originating the alarm. 3. Transmission of an alarm signal to the remote alarm receiving station. 4. Unlocking of electric door locks in designated egress paths. Release of fire and smoke doors held open by magnetic door holders. 6. Recall of elevators. 7. Shutdown of fans and other air-handling equipment serving zone when alarm was initiated. 89 8. Closing of smoke dampers in air ducts of system serving zone where alarm was initiated. Recording of the event in the system memory. 9. 10 10. Recording of the event by the system printer. Alarm Silencing, System Reset and Indication: Controlled by switches in the FACP and the remote 11 J. 12 annunciator. 13 1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm 14 silence" light. Display of identity of the alarm zone or device is retained. 15 2. Subsequent alarm signals from other devices or zones reactivate notification appliances until 16 silencing switch is operated again. When alarm-initiating devices return to normal and system reset switch is operated, notification 17 3. 18 appliances operate again until alarm silence switch is reset. 19 K. Water-flow alarm switch operation initiates the following: 1. Notification-appliance operation. 2. Flashing of the device location-indicating light for the device that has operated. 22 23 Operating a heat detector in the elevator shaft shuts down elevator power by operating a shunt trip in a L. circuit breaker feeding the elevator. 24 Water-flow alarm for connection to sprinkler in an elevator shaft and elevator machine room shuts down M. 25 elevators associated with the location without time delay. 26 A field-mounted relay actuated by the fire detector or the FACP closes the shunt trip circuit and 27 operates building notification appliances and annunciator. 28 N. Smoke detection for zones or detectors with alarm verification initiates the following: 29 1. Audible and visible indication of an "alarm verification" signal at the FACP. 30 Recording of the event by the system printer. 2. 31 General alarm if the alarm is verified. 3. 32 Cancellation of the FACP indication and system reset if the alarm is not verified. 4. 33 Ο. Sprinkler valve-tamper switch operation initiates the following: 34 1. A supervisory, audible, and visible "valve-tamper" signal indication at the FACP and the 35 annunciator. 36 2. Flashing of the device location-indicating light for the device that has operated.
- 39 P. Fire-pump power failure, including a dead-phase or phase-reversal condition, initiates the following:

Transmission of supervisory signal to remote alarm receiving station.

- 1. A supervisory, audible, and visible "fire-pump power failure" signal indication at the FACP and the
 - Recording of the event by the system printer. 2.

Recording of the event by the system printer.

- Transmission of trouble signal to remote alarm receiving station.
- 44 Q. Remote Detector Sensitivity Adjustment: Manipulation of controls at the FACP causes the selection of 45 specific addressable smoke detectors for adjustment, display of their current status and sensitivity settings, and control of changes in those settings. Same controls can be used to program repetitive, scheduled,

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- 1 automated changes in sensitivity of specific detectors. Sensitivity adjustments and sensitivity-adjustment 2 schedule changes are recorded in system memory and are printed out by the system printer.
- 3 R. Removal of an alarm-initiating device or a notification appliance initiates the following:
 - 1. A "trouble" signal indication at the FACP and the annunciator for the device or zone involved.
 - 2. Recording of the event by the system printer.
 - 3. Transmission of trouble signal to remote alarm receiving station.
- 7 S. Printout of Events: On receipt of the signal, print alarm, supervisory, and trouble events. Identify zone, 8 device, and function. Include type of signal (alarm, supervisory, or trouble), and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, 10 including the same information for device, location, date, and time. Commands initiate the printout of a list 11 of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.
- 12 Τ. FACP Alphanumeric Display: Plain-English-language descriptions of alarm, supervisory, and trouble 13 events; and addresses and locations of alarm-initiating or supervisory devices originating the report. 14 Display monitoring actions, system and component status, system commands, programming information, 15 and data from the system's historical memory.

16 2.3 **MANUAL PULL STATIONS**

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- 17 Description: Fabricated of metal or plastic, and finished in red with molded, raised-letter operating A. 18 instructions of contrasting color.
 - 1. Single-action mechanism initiates an alarm.
 - Indoor Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit 2. lifting for access to initiate an alarm.
 - 3. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm.
 - 4. Integral Addressable Module: Arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.

26 SMOKE DETECTORS 2.4

- 27 A. General: Include the following features:
 - Operating Voltage: 24-V dc, nominal. 1.
 - Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to 2. normal operation.
 - 3. Plug-in Arrangement: Detector and associated electronic components are mounted in a module that connects in a tamper-resistant manner to a fixed base with a twist-locking plug connection. Terminals in the fixed base accept building wiring.
 - 4. Integral Visual-Indicating Light: LED type. Indicates detector has operated.
 - 5. Sensitivity: Can be tested and adjusted in-place after installation.
- 28 29 30 31 32 33 34 35 36 Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) 6. 37 to the FACP.
- 38 В. Photoelectric Smoke Detectors: Include the following features:
- 39 1. Sensor: LED or infrared light source with matching silicon-cell receiver. 40
 - 2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.
 - 3. Integral Thermal Detector: Fixed-temperature type with 135 deg F setting.
- 43 C. Duct Smoke Detector: Photoelectric.

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Sampling Tube: Design and dimensions as recommended by the manufacturer for the specific 1 2 3 4 5 1. duct size, air velocity, and installation conditions where applied. 2. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit. 3. Test, reset buttons and lights shall be visible and accessible. Any detectors mounted above 6 feet shall have a remote box for accessibility. 6 2.5 OTHER DETECTORS 78 Heat Detector, Combination Type: Actuated by a fixed temperature of 135 deg F, unless otherwise A. indicated. 9 1. Mounting: Plug-in base, interchangeable with smoke detector bases. 10 Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) 2. 11 to the FACP. 12 2.6 **NOTIFICATION APPLIANCES** 13 Description: Equip for mounting as indicated and have screw terminals for system connections. A. 14 1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting 15 assembly. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism 16 B. behind a grille. Horns produce a sound-pressure level of 90 dB, measured 10 feet from the horn. 17 18 C. Visible Alarm Devices: Xenon strobe lights listed under UL 1971 with clear or nominal white polycarbonate 19 lens. Mount lens on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- high letters 20 on the lens. 1. Strobe Leads: Factory connected to screw terminals. 22 2.7 REMOTE DEVICE LOCATION-INDICATING LIGHTS AND IDENTIFICATION PLATES 23 24 25 26 27 A. Description: LED indicating light near each smoke detector that may not be readily visible, and each sprinkler water-flow switch and valve-tamper switch. Light is connected to flash when the associated device is in an alarm or trouble mode. Lamp is flush mounted in a single gang wall plate. A red, laminated, phenolic-resin identification plate at the indicating light identifies, in engraved white letters, device initiating the signal and room where the smoke detector or valve is located. For water-flow switches, the identification plate also designates protected spaces downstream from the water-flow switch. 29 2.8 MAGNETIC DOOR HOLDERS 30 Description: Units are equipped for wall or floor mounting as indicated and are complete with matching Α. 31 door plate. 1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force. 33 34 2. Wall-Mounted Units: Flush mounted, unless otherwise indicated. Rating: 120-V ac. 3. 35 B. Material and Finish: Match door hardware.

36 2.9 CENTRAL FACP

A. Cabinet: Lockable steel enclosure. Arrange interior components so operations required for testing or for normal maintenance of the system are performed from the front of the enclosure. If more than one unit is

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- 1 required to form a complete control panel, fabricate with matching modular unit enclosure to accommodate 2 components and to allow ample gutter space for field wiring and interconnecting panels.
 - Identify each enclosure with an engraved, red, laminated, phenolic-resin nameplate with lettering 1. not less than 1 inch high. Identify individual components and modules within cabinets with permanent labels.
 - 2. Mounting: Flush.

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- 7 B. Alarm and Supervisory Systems: Separate and independent in the FACP. Alarm-initiating zone boards 89 consist of plug-in cards. Construction requiring removal of field wiring for module replacement is unacceptable.
- 10 C. Control Modules: Include types and capacities required to perform all functions of fire alarm systems.
- 11 D. Indications: Local, visible, and audible signals announce alarm, supervisory, and trouble conditions. Each 12 type of audible alarm has a different sound.
- 13 E. Resetting Controls: Prevent the resetting of alarm, supervisory, or trouble signals while the alarm or 14 trouble condition still exists.
- 15 F. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP 16 and addressable system components, including annunciation, supervision, and control.
 - Display: A minimum of 80 characters; alarm, supervisory, and component status messages; and 1. indicate control commands to be entered into the system for control of smoke detector sensitivity and other parameters.
 - 2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
- 21 22 23 24 G. Instructions: Printed or typewritten instruction card mounted behind a plastic or glass cover in a stainlesssteel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

25 2.10 **REMOTE ANNUNCIATOR**

- 26 Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. A. 27 Also duplicate manual switching functions of the FACP, including acknowledging, silencing, reset, and test.
- 28 1. Mounting: Flush cabinet, NEMA 250, Class 1.
- 29 B. Graphic Display Panel for Remote Annunciator: Wall-mounted engraved panel indicating the building floor 30 plan with a "You Are Here" designation. Engrave zone, area, and floor designations on the face of the 31 panel.
 - 1. Materials: Satin-finished stainless steel or brushed aluminum.
 - 2. Floor Plan Boundary Lines: Engraved in the surface and filled with colored paint. Floor plan lines are black and 1/4 inch wide; zone boundaries are red and 1/8 inch wide.
 - 3. Engraved Legends: 1/4-inch- high minimum, in letters filled with red paint.
- 32 33 34 35 36 4. Mounting: Integral with lamp-type annunciator. Locate zone lamps in the floor plan zones they represent.

38 2.11 **EMERGENCY POWER SUPPLY**

- 39 A. General: Components include nickel-cadmium battery, charger, and an automatic transfer switch.
- 40 1. Battery Nominal Life Expectancy: 20 years, minimum.

- 1 B. Battery Capacity: Rated for 72 hours supervisory mode and 30 minutes in alarm mode.
 - Magnetic door holders are not served by emergency power. Magnetic door holders are released when normal power fails.
- C. Battery Charger: Solid-state, fully automatic, variable-charging-rate type. Provide capacity for 150 percent of the connected system load while maintaining batteries at full charge. If batteries are fully discharged, the charger recharges them completely within four hours. Charger output is supervised as part of system power supply supervision.
- 8 D. Integral Automatic Transfer Switch: Transfers the load to the battery without loss of signals or status indications when normal power fails.

10 2.12 <u>ADDRESSABLE INTERFACE DEVICE</u>

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- 11 A. Description: Microelectronic monitor module listed for use in providing a multiplex system address for listed fire and sprinkler alarm-initiating devices with normally open contacts.
- 13 B. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall or to a circuit-breaker shunt trip for power shutdown.

15 2.13 <u>DIGITAL ALARM COMMUNICATOR TRANSMITTER</u>

- 16 A. Listed and labeled under UL 864 and NFPA 72 1999 EDITION.
- B. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP, or from its own internal sensors or controls, and automatically transmits signal along with a unique code that identifies the transmitting station to the remote alarm receiving station. The message transmitted corresponds to standard designations for the fire-reporting system to which the signal is being transmitted and includes separately designated messages in response to the following events or conditions:
 - 1. Transmitter Low-Battery Condition: Sent when battery voltage is below 85 percent of rated value.
 - 2. System Test Message: Initiated by a manual test switch within the transmitter cabinet or automatically, at an optionally preselected time, once every 24 hours with transmission time controlled by a programmed timing device integral to transmitter controls.
 - 3. Transmitter Trouble Message: Actuated by failure, in excess of one-minute duration, of the transmitter normal power source or derangement of the wiring of the transmitter or any alarm input interface circuit or device connected to it.
 - 4. Local Fire Alarm System Trouble Message: Initiated by events or conditions that cause a trouble signal to be indicated on the building system.
 - 5. Local Fire Alarm System Alarm Message: Actuated when the building system goes into an alarm state. Identifies zone or device that initiated the alarm.
 - 6. Local Alarm System Supervisory Alarm Message: Actuated when the building alarm system indicates a supervisory alarm.

35 2.14 SYSTEM PRINTER

A. Description: Listed and labeled as an integral part of the fire alarm system.

37 2.15 GUARDS FOR PHYSICAL PROTECTION IN THE GYM

- 38 A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other devices requiring protection in the gym.
- 40 1. Factory fabricated and furnished by the manufacturer of the device.

- 1 2. Finish: Paint of color to match the protected device.
- 2 2.16 <u>WIRE</u>
- A. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
- 4 1. Low-Voltage Circuits: No. 16 AWG, minimum.
- 5 2. Line-Voltage Circuits: No. 12 AWG, minimum.
- 6 B. Power-Limited Circuits: NFPA 70, Types FPL, FPLR, or FPLP, as recommended by manufacturer.

7 PART 3 - EXECUTION

8 3.1 <u>EQUIPMENT INSTALLATION</u>

- 9 A. Connect the FACP with a disconnect switch with lockable handle or cover.
- 10 B. Manual Pull Stations: Mount semiflush in recessed back boxes.
- 11 C. Water-Flow Detectors and Valve Supervisory Switches: Connect for each sprinkler valve station required to be supervised.
- D. Ceiling-Mounted Smoke Detectors: Not less than 4 inches from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 30 feet apart in any direction.
- 16 E. Wall-Mounted Smoke Detectors: At least 4 inches, but not more than 12 inches, below the ceiling.
- 17 F. Smoke Detectors near Air Registers: Install no closer than 60 inches.
- 18 G. Duct Smoke Detectors: Comply with manufacturer's written instructions.
- 19 The state of the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
- 2. Install sampling tubes so they extend the full width of the duct.
- H. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
- 24 I. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Combine audible and visible alarms at the same location into a single unit.
- J. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling.
- 29 K. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- 30 L. FACP: Surface mount with tops of cabinets not more than 72 inches above the finished floor.
- 31 M. FAA: Install with the top of the panel not more than 72 inches above the finished floor.

32 3.2 WIRING INSTALLATION

- A. Wiring Method: Install wiring in metal raceway according to Division 16 Section "Raceways and Boxes."
 Conceal raceway except in unfinished spaces and as indicated. Use Class A wiring. Alarm initiation wiring shall separate from the alarm indicating wiring.
- B. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- 10 C. Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- D. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
- 16 E. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signal from other floors or zones.
- 19 F.

20 3.3 <u>IDENTIFICATION</u>

- A. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Electrical Identification."
- B. Install instructions frame in a location visible from the FACP.
- 24 C. Paint power-supply disconnect switch red and label "FIRE ALARM."

25 3.4 GROUNDING

- A. Ground cable shields and equipment according to system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
- B. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.
- C. Install grounding electrodes of type, size, location, and quantity as indicated. Comply with installation requirements in Division 16 Section "Grounding."
- Ground equipment and conductor and cable shields. For audio circuits, minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

36 3.5 <u>FIELD QUALITY CONTROL</u>

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect fieldassembled components and connections and to supervise pretesting, testing, and adjustment of the system. Report results in writing.

- B. Pretesting: After installation, align, adjust, and balance the system and perform complete pretesting.
 Determine, through pretesting, the compliance of the system with requirements of Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones, and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.
- 6 C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of witnesses to preliminary tests.
- 8 D. Final Test Notice: Provide a minimum of 10 days' notice in writing when the system is ready for final acceptance testing.
- 10 E. Minimum System Tests: Test the system according to procedures outlined in NFPA 72 1999 EDITION.
 11 Minimum required tests are as follows:
 - 1. Verify the absence of unwanted voltages between circuit conductors and ground.
 - 2. Test all conductors for short circuits using an insulation-testing device.
 - 3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on record drawings.
 - 4. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.
 - 5. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
 - 6. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
 - 7. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications.
 - 8. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.
- F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets Specifications and complies with applicable standards.
- G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log on the satisfactory completion of tests.
- 35 H. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.

36 3.6 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

39 3.7 <u>DEMONSTRATION</u>

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- 40 A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:
- Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, adjusting, and maintaining equipment and schedules. Provide a minimum of 8 hours' training, segregated into two (2) four-hour training sessions scheduled one (1) week apart.

- 2. Training Aid: Use the approved final version of the operation and maintenance manual as a 1 2 3 training aid.
 - 3. Schedule training with Owner, through Architect, with at least seven days' advance notice.

4 3.8 **ON-SITE ASSISTANCE**

- Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-A. site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three requested visits to Project site for this purpose.
- 8 **END OF SECTION 13851**

SECTION 15852 - DUST COLLECTION SYSTEM

2	PART 1 -	<u>GENERAL</u>
3	1.1	SECTION INCLUDES
4 5	A.	Woodworking shop dust collection two-stage separator, ductwork, equipment hoods, floor sweeps, blast gates, and accessories.
6	1.2	SUBMITTALS
7 8	A.	Submittals are required and shall include product data noting capacity, materials, controls, dimensions, and accessories and detailed ductwork layouts specific to each system.
9	1.3	QUALITY ASSURANCE
10 11	A.	Design and installation shall be in accordance with the Industrial Ventilation Manual of the American Conference of Governmental Industrial Hygienist.
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13	PART 2 -	<u>PRODUCTS</u>
14	2.1	<u>DUST COLLECTOR</u>
15	A.	Primary collector shall be two-stage type.
16	B.	Dust shall be precipitated into 55-gallon drums (two required).
17	C.	Unit shall be constructed of heavy-gauge, cold rolled steel.
18	D.	Final finish of primer and enamel paint.
19 20 21 22	E.	Unit shall be factory assembled and shall include motor/blower, separate chamber, tripod support stand, dust bag, drum lid, flexible hose, and hose clamps.
23	2.2	DUCTWORK AND ACCESSORIES
24	A.	Ductwork shall be comprised of galvanized steel spiral pipe of not less than 22 gauge material.
25 26	B.	Elbows used in installation shall be a minimum of 2-gauges heavier construction than the straight pipe of equal diameter.
27	C.	Hoods shall be constructed of not less than 18 gauge galvanized steel material.
28	D.	Flexible duct connections shall be non-collapsible, flexible metallic hose.

2	E.	Blast gates shall allow for locking the gate in an open position or for removal of gate. Butterfly dampers are not permitted.
3	F.	Cleanouts shall include a piano hinged door with spring clamps, locking latches, and edge felting to prevent air leaks.
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6	PART 3	- EXECUTION
7	3.01	INSTALLATION
8	A.	Install in accordance with manufacturers requirements.
9 10	В.	Secure all duct and elbow joints with self-tapping screws and caulk or hard cast type sealer. Duct tape is not acceptable.
11	C.	Position cleanouts with hinged side at bottom center of ductwork.
12	D.	Blast gates shall be positioned within each reach of equipment operator.
13 14	E.	Manufacturer's service representative shall provide complete check, test, and start-up on the system.
15	F.	Construct hoods to suit actual equipment and site conditions.
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18	END OF	SECTION 15852
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1 SECTION 15854 - WELDING EXHAUST SYSTEM 2 PART 1 - GENERAL 3 1.1 SECTION INCLUDES 4 A. Source capture devices, ductwork, flexible hoses and accessories. 5 1.2 **SUBMITTALS** 6 7 Submittals are required and shall include product data noting capacity, materials, controls, A. dimensions, and accessories and detailed ductwork layouts. 8 1.3 QUALITY ASSURANCE Design and installation shall be in accordance with the Occupational Safety and Health A. 10 Administration (OSHA). 11 Flexible hoses shall meet UL-94 fire retardant requirements. 12 PART 2 - PRODUCTS 13 2.1 SOURCE CAPTURE DEVICES 14 A. Constructed of reinforced fiberglass for fire retardance. 15 B. Minimum 24 inches by 18 inches open face with an 8 inch diameter connection. 16 C. Vertical support rail that allows for adjustment of capture device height, designed for wall 17 mounting. 18 D. Safety screen in throat. 19 20 21 2.2 **DUCTWORK** 22 A. Round ductwork shall be manufactured of heavy gauge galvanized steel with a spiral lockseam. 23 B. Fittings and couplings shall be constructed of 20 gauge galvanized steel. 24 25 2.3 **FLEXIBLE HOSES**

Manufactured of polyvinyl chloride reinforced with a hard drawn steel spiral bead wire.

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1	B.	Operating pressure of –7 psi to +5 psi.
2	C.	Operating temperature of –10 degrees Fahrenheit to +180 degrees Fahrenheit.
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4	PART 3 -	- EXECUTION
5	3.01	INSTALLATION
6	A.	Install in accordance with manufacturer's requirements.
7 8	В.	Manufacturer's service representative shall provide complete check, test, and start-up on the system.
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11	END OF	SECTION 15854
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1 SECTION 15949 - BUILDING AUTOMATION SYSTEM (BAS) GENERAL

2 PART I. GENERAL

3 1.01 SECTION INCLUDES

- 4 A. General Requirements
- 5 B. Description of Work
- 6 C. Quality Assurance
- 7 D. System Architecture
- 8 E. Distributed Processing Units/Quantity and Location
- 9 F. Demolition and Reuse of Existing Materials and Equipment
- 10 G. Sequence of Work

11 1.02 RELATED DOCUMENTS

- 12 A. Section 15050 -Basic Mechanical Materials and Methods
- 13 B. Section 15951 Building Automation System (BAS) Basic Materials, Interface Devices, and Sensors
- 15 C. Section 15952 BAS Operator Interfaces
- D. Section 15953 BAS Field Panels
- 17 E. Section 15954 BAS Communication Devices
- F. Section 15955 BAS Software and Programming
- 19 G. Section 15958 Sequences of Operation
- 20 H. Section 15959 BAS Commissioning

21 1.03 DESCRIPTION OF WORK

- A. Contractor shall furnish and install a direct digital control and building automation system (BAS).
 The new BAS shall utilize electronic sensing, microprocessor-based digital control, and electronic actuation of dampers and valves to perform control sequences and functions specified. The BAS for this project will generally consist of monitoring and control of systems listed below. Reference also controls drawings, sequences of operation, and points lists.
- B. The BAS contractor shall provide system software based on server/thin-client architecture, designed around the open standards of web technology. The BAS server shall communicate using ASHRAE's BACnet/IP protocol, and in addition, offer concurrent support over the same data-link of the following protocols: LonWorks, MODBUS, and SNMP. Server shall be accessed using a web browser over the DC Government LAN and remotely over the Internet.

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- C. The intent of the thin-client architecture is to provide the operator(s) complete access to the BAS system via a web browser. The thin-client web browser Graphical User Interface (GUI) shall be browser and operating system agnostic, meaning it will support Microsoft and Netscape Navigator browsers (5.x or later versions), and Windows operating systems. The web browser GUI shall provide a completely interactive user interface. No special software, (active-x components or fat java clients) shall be required to be installed on the PC's used to access the BAS via a web browser.
- D. The BAS server software must support at least the following server platforms (Windows NT, Sun Solaris and Linux). The BAS server software shall be developed and tested by the control system manufacturer. Third party manufactured and developed BAS software is not acceptable.
 - E. The HVAC systems being controlled include:
 - HPW System 2 boilers, 2 cooling towers, 4 variable flow HPW pumps, 2 condenser water pumps.
 - 2. HW System 2 boilers, 2 HW pumps.
 - 3. Air Handlers
 - 4. Make-Up Air Handlers
 - 5. Energy Recovery Units
 - 6. Water Source Heat Pumps
 - 7. Radiators and Unit Heaters
 - Exhaust Fans
- F. This Section defines the manner and method by which these controls function.

23 1.04 APPLICATION OF OPEN PROTOCOLS

- A. Subject to the detailed requirements provided throughout the specifications, the BAS and digital control and communications components installed, as work of this contract shall be an integrated distributed processing system utilizing the following standards:
 - BACnet: System components shall communicate using native BACnet in accordance with ASHRAE Standard 135 and current addenda and annexes, including all workstations, all building controllers, and all application specific controllers. Gateways to other communication protocols are not acceptable.

31 1.05 QUALITY ASSURANCE

- A. Product Line Demonstrated History: The product line being proposed for the project must have an installed history of demonstrated satisfactory operation for a length of 1 year since date of final completion in at least 10 installations of comparative size and complexity. Submittals shall document this requirement with references.
- B. Installer's Qualifications: Firms specializing and experienced in control system installations for not less than 5 years. Firms with experience in DDC installation projects, with point counts equal to that of this project and systems of the same character as this project. If installer is a Value Added Reseller (VAR) of a manufacturer's product, installer must demonstrate at least three years prior experience with that manufacturer's products. Experience starts with awarded Final Completion of previous projects. Submittals must document this experience with references.
- C. Installer's Experience with Proposed Product Line: Firms shall have specialized in and be experienced with the installation of the proposed product line for not less than one year from date of final completion on at least 3 projects of similar size and complexity. Submittals shall document this experience with references.

D. Installer's Field Coordinator and Sequence Programmer Qualifications: 2 specialize in and be experienced with control system installation for not less than 5 years. 3 Proposed field coordinator shall have experience with the installation of the proposed product line 4 for not less than 2 projects of similar size and complexity. Installer shall submit the names of the 5 proposed individual and at least one alternate for each duty. Submittals shall document this experience with references. The proposed individuals must show proof of the following training: 6 7 Product Line Training: Individuals overseeing the installation and configuration of the proposed product line must provide evidence of the most advanced training offered by the 8 Manufacturer on that product line for installation and configuration. 9 10 Programming Training: Individuals involved with programming the site-specific sequences shall provide evidence of the most advanced programming training offered by the vendor of 11 the programming application offered by the Manufacturer. 12 13 E. Installer's Service Qualifications: The installer must be experienced in control system operation, 14 maintenance and service. Installer must document a minimum 5 year history of servicing 15 installations of similar size and complexity. Installer must also document at least a one year history 16 of servicing the proposed product line. F. 17 Installer's Response Time and Proximity 18 Installer must maintain a fully capable service facility within a 45 mile radius of the project site. 19 Service facility shall manage the emergency service dispatches and maintain the inventory of 20 21 Emergency response times are listed below in this section. Installer must demonstrate the 22 ability to meet the response times. 23 1.06 **CODES AND STANDARDS** 24 A. The following codes and standard intended to apply as applicable as not all will apply to all 25 26 В. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) 27 ASHRAE 135-1995: BACnet - A Data Communication Protocol for Building Automation and 28 Control Networks. American Society of Heating, Refrigerating and Air-Conditioning 29 Engineers, Inc. 1995 including Addendums A through E C. 30 **Electronics Industries Alliance** 31 EIA-709.1-A-99: Control Network Protocol Specification 1. 32 2. EIA-709.3-99: Free-Topology Twisted-Pair Channel Specification 33 3. EIA-232: Interface Between Data Terminal Equipment and Data Circuit-Terminating 34 Equipment Employing Serial Binary Data Interchange. 35 4. EIA-458: Standard Optical Fiber Material Classes and Preferred Sizes EIA-485: Standard for Electrical Characteristics of Generator and Receivers for use in 36 37 Balanced Digital Multipoint Systems. 38 6. EIA-472: General and Sectional Specifications for Fiber Optic Cable 39 EIA-475: Generic and Sectional Specifications for Fiber Optic Connectors and all Sectional 7. 40 Specifications 41 8. EIA-573: Generic and Sectional Specifications for Field Portable Polishing Device for 42 Preparation Optical Fiber and all Sectional Specifications 43 EIA-590: Standard for Physical Location and Protection of Below-Ground Fiber Optic Cable 44 Plant and all Sectional Specifications

Underwriters Laboratories

UL 916: Energy Management Systems.

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- 1 E. NEMA Compliance
 - NEMA 250: Enclosure for Electrical Equipment
 - NEMA ICS 1: General Standards for Industrial Controls.
- 4 F. NFPA Compliance
 - 1. NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" where applicable to controls and control sequences.
 - 2. NFPA 70 National Electrical Code (NEC)
- 8 G. Institute of Electrical and Electronics Engineers (IEEE)
 - 1. IEEE 142: Recommended Practice for Grounding of Industrial and Commercial Power Systems
 - 2. IEEE 802.3: CSMA/CD (Ethernet Based) LAN
 - 3. IEEE 802.4: Token Bus Working Group (ARCNET Based) LAN

13 1.07 <u>DEFINITIONS</u>

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- A. Advanced Application Controller (AAC): A device with limited resources relative to the Building Controller (BC). It may support a level of programming and may also be intended for application specific applications.
- B. Application Protocol Data Unit (APDU): A unit of data specified in an application protocol and consisting of application protocol control information and possible application user data (ISO 9545).
- C. Application Specific Controller (ASC): A device with limited resources relative to the Advanced Application Controller (AAC). It may support a level of programming and may also be intended for application-specific applications.
- D. BACnet/BACnet Standard: BACnet communication requirements as defined by ASHRAE/ANSI 135-1995.
- E. BACnet Interoperability Building Blocks (BIBB): A BIBB defines a small portion of BACnet functionality that is needed to perform a particular task. BIBBS are combined to build the BACnet functional requirements for a device in a specification.
- F. Binding: In the general sense, binding refers to the associations or mappings of the sources network variable and their intended opr required destinations.
- 29 G. Building Automation System (BAS): The entire integrated management and control system
- H. Building Controller (BC): A fully programmable device capable of carrying out a number of tasks including control and monitoring via direct digital control (DDC) of specific systems, acting as a communications router between the LAN backbone and sub-LANs, and data storage for trend information, time s chedules, and alarm data.
- I. Change of Value (COV): An event that occurs when a measured or calculated analog value changes by a predefined amount (ASHRAE/ANSI 135-1995).
- 36 J. Client: A device that is the requestor of services from a server. A client device makes requests of and receives responses from a server device.
- K. Continuous Monitoring: A sampling and recording of a variable based on time or change of state (e.g. trending an analog value, monitoring a binary change of state).
- 40 L. Controller or Control Unit (CU): Intelligent stand-alone control panel. Controller is a generic reference and shall include BCs, AACs, and ASCs as appropriate.

M. Control Systems Server (CSS): This shall be a computer (or computers) that maintain the systems 2 configuration and programming database. This may double as an operator workstation. 3 N. Direct Digital Control (DDC): Microprocessor-based control including Analog/Digital conversion and 4 program logic 5 O. Functional Profile: A collection of variables required to define the key parameters for a standard application. As this applies to the HVAC industry, this would include applications like VAV terminal, 6 7 fan coil units, and the like. P. 8 Gateway (GTWY): A device, which contains two or more dissimilar networks/protocols, permitting 9 information exchange between them (ASHRAE/ANSI 135-1995). 10 Q. Hand Held Device (HHD): Manufacturer's microprocessor based device for direct connection to a Controller. 11 12 R. IT LAN: Reference to the facility's Information Technology network, used for normal business-13 related e-mail and Internet communication. 14 S. LAN Interface Device (LANID): Device or function used to facilitate communication and sharing of 15 data throughout the BAS T. 16 Local Area Network (LAN): General term for a network segment within the architecture. Various 17 types and functions of LANs are defined herein. 18 U. Local Supervisory LAN: Ethernet-based LAN connecting Primary Controller LANs with each other 19 and OWSs and CSSs. See System Architecture below. 20 V. Master-Slave/Token Passing (MS/TP): Data link protocol as defined by the BACnet standard. 21 (ASHRAE/ANSI 135-1995). W. 22 Open Database Connectivity (ODBC): An open standard application-programming interface (API) 23 for accessing a database developed. ODBC compliant systems make it possible to access any 24 data from any application, regardless of which database management system (DBMS) is handling 25 the data. X. 26 Operator Interface (OI): A device used by the operator to manage the BAS including OWSs, POTs, 27 and HHDs. 28 Y. Operator Workstation (OWS): The user's interface with the BAS system. As the BAS network 29 devices are stand-alone, the OWS is not required for communications to occur. Z. 30 Point-to-Point (PTP): Serial communication as defined in the BACnet standard. 31 AA. Portable Operators Terminal (POT): Laptop PC used both for direct connection to a controller and for remote dial up connection. 32. BB. 33 Protocol Implementation Conformance Statement (PICS): A written document, created by the 34 manufacturer of a device, which identifies the particular options specified by BACnet that are

implemented in the device (ASHRAE/ANSI 135-1995).

AACs and ASCs. Refer to System Architecture below.

Router: A device that connects two or more networks at the network layer.

reliable than the Primary Controlling LAN. Refer to System Architecture below.

Primary Controlling LAN: High speed, peer-to-peer controller LAN connecting BCs and optionally

Secondary Controlling LAN: LAN connecting AACs and ASCs, generally lower speed and less

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- FF. Server: A device that is a provider of services to a client. A client device makes requests of and receives responses from a server device.
 - GG. SQL: Standardized Query Language, a standardized means for requesting information from a database.
 - HH. Smart Device: A control I/O device such as a sensor or actuator that can directly communicate with the controller network to which it is connected. This differs from an ASC in that it typically deals only with one variable.
 - II. XML (Extensible Markup Language): A specification developed by the World Wide Web Consortium. XML is a pared-down version of SGML, designed especially for Web documents. It allows designers to create their own customized tags, enabling the definition, transmission, validation, and interpretation of data between applications and between organizations.

1.08 FUNCTIONAL INTENT

A. Throughout Sections 15950 through 15955, the Sequences of Operation, and Section 15959 detailed requirements are specified, some of which indicate a means, method or configuration acceptable to meet that requirement. Contractor may submit products that utilize alternate means, methods, and configurations that meet the functional intent. However these will only be allowed with prior approval.

18 1.09 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Electronic Submittals: While all requirements for hard copy submittal apply, control submittals and O&M information shall also be provided in electronic format as follows.
 - Drawings and Diagrams: Shop drawings shall be provided on electronic media as an AutoCAD 2002 or later version drawing file and/or Adobe Portable Document Format file. All 'cross-reference' and font files must be provided with AutoCAD files.
 - 2. Other Submittals: All other submittals shall be provided in Adobe Portable Document Format
 - C. Qualifications: Manufacturer, Installer, and Key personnel qualifications as indicated for the appropriate item above.
 - D. Product Data: Submit manufacturer's technical product data for each control device, panel, and accessory furnished, indicating dimensions, capacities, performance and electrical characteristics, and material finishes. Also include installation and start-up instructions.
 - E. Shop Drawings: Submit shop drawings for each control system, including a complete drawing for each air handling unit, system, pump, device, etc. with all point descriptors, addresses and point names indicated. Each shop drawing shall contain the following information:
 - 1. System Architecture and System Layout:
 - a) One-line diagram indicating schematic locations of all control units, workstations, LAN interface devices, gateways, etc. Indicate network number, device ID, address, device instance, drawing reference number, and controller type for each control unit. Indicate media, protocol, baud rate, and type of each LAN. Indicate media, protocol, baud rate, and type of each LAN. All optical isolators, repeaters, end-of-line resistors, junctions, ground locations etc. shall be located on the diagram.
 - b) Provide floor plans locating all control units, workstations, servers, LAN interface devices, gateways, etc. Include all WAN and LAN communication wiring routing, power wiring, power originating sources, and low voltage power wiring. Indicate network number, device ID, address, device instance, drawing reference number, and controller type for each control unit. Indicate media, protocol, baud rate, and type of each LAN.

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9		and point addresses identified as listed in the point summary table.
10 11 12 13		4. With each schematic, provide a point summary table listing building number and abbreviation, system type, equipment type, full point name, point description, Ethernet backbone network number, network number, device ID, object ID (object type, instance number). See Section 15955 - Part III for additional requirements.
14		5. Label each control device with setting or adjustable range of control.
15		6. Label each input and output with the appropriate range.
16 17 18		7. Provide a Bill of Materials with each schematic. Indicate device identification to match schematic and actual field labeling, quantity, actual product ordering number, manufacturer, description, size, voltage range, pressure range, temperature range, etc. as applicable.
19 20 21		8. With each schematic, provide valve and actuator information including size, Cv, design flow, design pressure drop, manufacturer, model number, close off rating, etc. Indicate normal positions of spring return valves and dampers.
22 23 24 25 26 27		9. Indicate all required electrical wiring. Electrical wiring diagrams shall include both ladder logic type diagram for motor starter, control, and safety circuits and detailed digital interface panel point termination diagrams with all wire numbers and terminal block numbers identified. Provide panel termination drawings on separate drawings. Ladder diagrams shall appear on system schematic. Clearly differentiate between portions of wiring, which are existing, factory-installed and portions to be field-installed.
28 29		10. Details of control panels, including controls, instruments, and labeling shown in plan or elevation indicating the installed locations.
30		11. Sheets shall be consecutively numbered.
31 32		12. Each sheet shall have a title indicating the type of information included and the HVAC system controlled.
33		13. Table of Contents listing sheet titles and sheet numbers.
34		14. Legend and list of abbreviations.
35		15. Memory allocation projections.
36 37		16. Submit along with shop drawings but under separate cover calculated and guaranteed system response times of the most heavily loaded LAN in the system.
38	F.	Open Protocol Information
39		1. BACnet Systems:
40		a) BACnet object description, object ID, and device ID, for each I/O point.
41 42		 Documentation for any non-standard BACnet objects, properties, or enumerations used detailing their structure, data types, and any associated lists of enumerated values.
43		c) Submit PICS indicating the BACnet functionality and configuration of each controller.
44 45 46 47	G.	Framed Control Drawings: Laminated control drawings including system control schematics, sequences of operation and panel termination drawings, shall be provided in panels for major pieces of equipment. Terminal unit drawings shall be located in the central plant equipment panel or mechanical room panel.
48	H.	Control Logic Documentation
49 50		 Submit control logic program listings (for graphical programming) and logic flow charts illustrating (for line type programs) to document the control software of all control units.

accurately reflect accurate, actual installed conditions.

All optical isolators, repeaters, end-of-line resistors, junctions, ground locations etc. shall

be located on the floor plans. Wiring routing as -built conditions shall be maintained accurately throughout the construction period and the drawing shall be updated to

Schematic flow diagram of each air and water system showing fans, coils, dampers, valves,

pumps, heat exchange equipment and control devices. Include verbal description of sequence

All physical points on the schematic flow diagram shall be indicated with names, descriptors,

1 2 3			 Control logic shall be annotated to describe how it accomplishes the sequence of operation. Annotations shall be sufficient to allow an operator to relate each program component (block or line) to corresponding portions of the specified Sequence of Operation.
4			3. Include written description of each control sequence.
5 6			4. Include control response, settings, setpoints, throttling ranges, gains, reset schedules adjustable parameters and limits.
7			5. Sheets shall be consecutively numbered.
8 9			Each sheet shall have a title indicating the controller designations and the HVAC system controlled.
10			7. Include Table of Contents listing sheet titles and sheet numbers
11 12 13			 Submit one complete set of programming and operating manuals for all digital controllers concurrently with control logic documentation. This set will count toward the required number of Operation and Maintenance materials specified below and in Section 01330.
14		I.	Operation and Maintenance Materials:
15 16 17			 Submit documents under provisions of Section 01330. One copy of the materials shall be delivered directly to the facility's operation staff, in addition to the copies required by other Sections.
18 19			Submit maintenance instructions and spare parts lists for each type of control device, contro unit, and accessory.
20 21			Submit BAS User's Guides (Operating Manuals) for each controller type and for al workstation hardware and software and workstation peripherals.
22 23			 Submit BAS advanced Programming Manuals for each controller type and for all workstation software.
24 25 26			 Include all submittals (product data, shop drawings, control logic documentation, hardware manuals, software manuals, installation guides or manuals, maintenance instructions and spare parts lists) in maintenance manual; in accordance with requirements of Division 1.
27 28 29 30		J.	Controls contractor shall provide all product line technical manuals and technical bulletins, to include new and upgraded products, by the same distribution channel as to dealers or branches. This service will be provided for 5 years as part of the contract price, and will be offered thereafter for the same price as to a dealer or branch.
31 32		K.	Manufacturers Certificates: For all listed and/or labeled products, provide certificate o conformance.
33 34		L.	Product Warranty Certificates: submit manufacturers product warranty certificates covering the hardware provided.
35	1.10	PROJE	ECT RECORD DOCUMENTS
36		A.	Submit documents under provisions of Section 01330.
37 38		B.	Record copies of product data and control shop drawings updated to reflect the final installed condition.
39 40 41 42		C.	Record copies of approved control logic programming and database on paper and on CD's. Accurately record actual setpoints and settings of controls, final sequence of operation, including changes to programs made after submission and approval of shop drawings and including changes to programs made during specified testing.

Record copies of approved project specific graphic software on CDs.

field with specific controller identification, description and location information.

Provide as -built network architecture drawings showing all BACnet nodes including a description

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- F. 1 Record copies shall include individual floor plans with controller locations with all interconnecting 2 wiring routing including space sensors, LAN wiring, power wiring, low voltage power wiring. 3 Indicate device instance and drawing reference number. 4
 - G. Provide record riser diagram showing the location of all controllers.
 - H. Maintain project record documents throughout the warranty period and submit final documents at the end of the warranty period.

1.11 SYSTEM ARCHITECTURE

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- A. The system provided shall incorporate hardware resources sufficient to meet the functional requirements of these Specifications. The Contractor shall include all items not specifically itemized in these Specifications that are necessary to implement, maintain, and operate the system in compliance with the functional intent of these Specifications.
- B. The system shall be configured as a distributed processing network(s) capable of expansion as specified below.
- C. The system architecture shall consist of an Ethernet-based, wide area network (WAN), a single Local Area Network (LAN) or multi-leveled LANs that support BCs, AACs, ASCs, Operator Workstations (OWS), and Remote Communication Devices (RCDs) as applicable. The following indicates a functional description of the BAS structure.
 - Local Supervisory LAN: The Local Supervisory LAN shall be an Ethernet-based, 100 Mbps LAN connecting Primary Control LANs and OWSs. The LAN serves as the inter-BC gateway and OWS-to-BC gateway and communications path. LAN shall be IEEE 802.3 Ethernet over Fiber or Category 5 cable with switches and routers that support 100 Mbps throughput. Power-line carrier communication shall not be acceptable for communications. The physical media will be that installed for the IT infrastructure of the facility and as such network drops will be provided under that scope of work to facilitate work of this scope. This network will be 100 Mbps and therefore all network interface cards shall support that speed. The higher level lavers of this network shall be as follows:
 - BACnet Supervisory LAN: BACnet/IP as defined in Addendum A (Annex J) of the BACnet standard, and shall share a common network number for the Ethernet backbone, as defined in BACnet. Point/Object naming conventions are specified in 15955 - Part III.
 - Primary Controller LAN ('Primary LAN'): High-speed, peer-to-peer communicating LAN used to connect AACs, ASCs and Building Controllers (BCs) and communicate exclusively control information. Acceptable technologies include:
 - a) Ethernet (IEEE802.3)
 - b) ARCNET (IEEE802.4)
 - Secondary Controller LAN ('Secondary LAN'): Network used to connect AACs, ASCs or SDs. These can be Master Slave/ Token Passing or polling, in addition to those allowed for Primary Controller LANs. Network speed vs. the number of controllers on the LAN shall be dictated by the response time and trending requirements.
- D. Dynamic Data Access: Any data throughout any level of the network shall be available to and accessible by all other devices, Controllers and OWS, whether directly connected or connected remotely.

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- E. Remote Data Access: The system shall support the following methods of remote access to the building data.
 - Browser-based access: A remote user using a standard browser shall be able access all control system facilities and graphics with proper password. DC Government shall secure and pay for the continuous Internet connection. The following paradigms are acceptable for browser-based access:
 - Native Internet-based user interfaces (HTML, Java, XML, etc.) that do not require a plug-in.
 - b) User interfaces that via a standard browser use a freely distributed and automatically downloaded and installed plug-in or 'thick' client that presents the user interface across the web.
 - DSL. All workstations shall be equipped with standard 100 megabit Ethernet cards; the DC Government at its option may elect to use DSL or other broadband service to access the system.
 - 3. Dial-in via minimum of a 56k modem. A backup dial-in connection shall allow access to all control system facilities and graphics with appropriate password. The DC Government shall provide and pay for the digital grade voice line to support this remote connection.
- F. The communication speed between the controllers, LAN interface devices, and operator interface devices shall be sufficient to ensure fast system response time under any loading condition. Contractor shall submit guaranteed response times with shop drawings including calculations to support the guarantee. In no case shall delay times between an event, request, or command initiation and its completion be greater than those listed herein. Contractor shall reconfigure LAN as necessary to accomplish these performance requirements. Generally requirements do not apply when a remote connection must be established via modem:
 - 5 seconds between a Level 1 (critical) alarm occurrence and enunciation at operator workstation.
 - 2. 10 seconds between a Level 2 alarm occurrence and enunciation at operator workstation.
 - 3. 20 seconds between and a Level 3-5 alarm occurrence and enunciation at operator workstation.
 - 4. 10 seconds between an operator command via the operator interface to change a setpoint and the subsequent change in the controller.
 - 5. 5 seconds between an operator command via the operator interface to start/stop a device and the subsequent command to be received at the controller.
 - 6. 10 seconds between a change of value or state of an input and it being updated on the operator interface.
 - 7. 10 seconds between an operator selection of a graphic and it completely painting the screen and updating at least 10 points.
- G. Control Systems Server (CSS): This shall be a computer (or computers) that maintain the systems configuration and programming database. This may double as an operator workstation. It shall hold the backup files of the information downloaded into the individual controllers and as such support uploading and downloading that information directly to/from the controllers. It shall also act as a control information server to non-control system based programs. It shall allow secure multiple-access to the control information. Refer to Section 15952 BAS Operator Interfaces for its requirements.
- H. The Operator Interface shall provide for overall system supervision, graphical user interface, management report generation, alarm annunciation, and remote monitoring. Refer to Section 15952 BAS Operator Interfaces.

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- I. The BCs, AACs, ASCs, and SDs shall monitor, control, and provide the field interface for all points specified. Each BC, AAC, or ASC shall be capable of performing all specified energy management functions, and all DDC functions, independent of other BCs, AACs, or ASCs and operator interface devices as more fully specified in Section 15953 BAS Field Panels.
- J. Systems Configuration Database: The system architecture shall support maintaining the systems configuration database on a server or workstation on the Local Supervisory LAN. User tools provided to the DC Government shall allow configuring, updating, maintaining, etc. current configurations and settings whether they are initiated at the server or the end device.
 - Database Schema shall be published and provided to the DC Government to facilitate easy access to the data.
 - 2. Database shall be ODBC compliant or a data access driver shall be provided to act as an ODBC or OLE DB data provider.
- K. Interruptions or fault at any point on any Primary Controller LAN shall not interrupt communications between other nodes on the network. If a LAN is severed, two separate networks shall be formed and communications within each network shall continue uninterrupted.
- L. All line drivers, signal boosters, and signal conditioners etc. shall be provided as necessary for proper data communication.
- M. Anytime any controller's database or program is changed in the field, the controller shall be capable of automatically uploading the new data to the CSS.

1.12 WARRANTY MAINTENANCE

- A. Contractor shall warrant all products and labor for a period of one year after Final Acceptance.
 - B. The DC Government reserves the right to make changes to the BAS during the warranty period. Such changes do not constitute a waiver of warranty. The Contractor shall warrant parts and installation work regardless of any such changes made by the DC Government, unless the Contractor provides clear and convincing evidence that a specific problem is the result of such changes to the BAS. Any disagreement between the DC Government and the Contractor on such matters shall be subject to resolution through the contract 'Disputes' clause.
 - C. At no cost to the DC Government, during the warranty period, the Contractor shall provide maintenance services for software and hardware components as specified below:
 - Maintenance services shall be provided for all devices and hardware specified in sections 15951 through 15959. Service all equipment per the manufacturer's recommendations. All devices shall be calibrated within the last month of the warranty period.
 - Emergency Service: Any malfunction, failure, or defect in any hardware component or failure
 of any control programming that would result in property damage or loss of comfort control
 shall be corrected and repaired following telephonic notification by the DC Government to the
 Contractor.
 - Response by telephone to any request for service shall be provided within two (2) hours
 of the DC Government's initial telephone request for service.
 - In the event that the malfunction, failure, or defect is not corrected through the telephonic communication, at least one (1) hardware and software technician, trained in the system to be serviced, shall be dispatched to the DC Government's site within eight (8) hours of the DC Government's initial telephone request for such services, as specified.

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2 3 4 5			3.	any shal	mal Service: Any malfunction, failure, or defect in any hardware component or failure of control programming that would not result in property damage or loss of comfort control be corrected and repaired following telephonic notification by the DC Government to the stractor.
6 7 8				a)	Response by telephone to any request for service shall be provided within eight (8) working hours (contractor specified 40 hr per week normal working period) of the DC Government's initial telephone request for service.
9 10 11 12 13				b)	In the event that the malfunction, failure, or defect is not corrected through the telephonic communication, at least one (1) hardware and software technician, trained in the system to be serviced, shall be dispatched to the DC Government's site within three (3) working days of the DC Government's initial telephone request for such services, as specified.
14 15 16 17 18			4.	thre- leas can	Government's Telephonic Request for Service: Contractor shall specify a maximum of e telephone numbers for the DC Government to call in the event of a need for service. At one of the lines shall be attended at any given time at all times. Alternatively, pagers be used for technicians trained in system to be serviced. One of the three paged nicians shall respond to every call within 15 minutes.
19 20			5.		hnical Support: Contractor shall provide technical support by telephone throughout the ranty period.
21 22			6.		ventive maintenance shall be provided throughout the warranty period in accordance with hardware component manufacturer's requirements.
23	1.13	DELIV	ERY, S	STOR	AGE, AND HANDLING
24 25 26		A.	duri	ng sh	actory-shipping cartons for each piece of equipment and control device. Maintain cartons ipping, storage and handling as required to prevent equipment damage, and to eliminate noisture from equipment. Store equipment and materials inside and protect from weather.
27	1.14	LISTIN	G ANI	D LAE	<u>BELING</u>
28 29		The BA		d com tem.	ponents shall be listed by Underwriters Laboratories (UL 916) as an Energy Management
30	PART I	I.	PAF	RT 2 -	PRODUCTS
31	2.01	MATE	RIALS	AND	<u>EQUIPMENT</u>
32 33 34		A.	shal	I not	shall be new, the best of their respective kinds without imperfections or blemishes and be damaged in any way. Used equipment shall not used in any way for the permanent en except where drawings or specs specifically allow existing materials to remain in place.
35	2.02	UNIFO	RMIT	<u>Y</u>	
36 37		A.			tent practical, all equipment of the same type serving the same function shall be identica the same manufacturer

1 PART III. PART 3 - EXECUTION

2 3.01 INSPECTION

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A. Examine areas and conditions under which control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

5 3.02 INSTALLATION OF CONTROL SYSTEMS

- 6 A. General: Install systems and materials in accordance with manufacturer's instructions, roughing-7 in drawings and details shown on drawings.
 - B. Refer to additional requirements in other sections of this specification.

9 3.03 <u>DIGITAL CONTROL STATIONS, CONTROLLER QUANTITY AND LOC ATION</u>

- 10 A. Individual Digital Control Stations (DCS) are referenced to indicate allocation of points to each DCS and DCS location. Digital control stations shall consist of one or multiple controllers to meet requirements of this specification.
 - B. Where a DCS is referenced, Contractor shall provide at least one (1) controller, and additional controllers as required, in sufficient quantity to meet the requirements of this Specification. Restrictions in applying controllers are specified in Section 15953: BAS Field Panels. This Contractor shall extend power to the DCS from an acceptable power panel. If the control contractor wishes to further distribute panels to other locations, control contractor is responsible for extending power to that location also. Furthermore, contractor is responsible for ensuring adequate locations for the panels that do not interfere with other requirements of the project and maintain adequate clearance for maintenance access.
 - C. Contractor shall locate DCSs as referenced. It is the Contractor's responsibility to provide enough controllers to ensure a completely functioning system, according to the point list and sequence of operations.
- D. Contractor shall provide a minimum of the following:
 - 1. One DCS (including at least one controller) in each chilled water plant mechanical room.
 - 2. One controller for each air handler located in applicable mechanical room.
 - 3. One controller shall be provided for each terminal unit unless indicated otherwise.

28 3.04 SURGE PROTECTION

A. The Contractor shall furnish and install any power supply surge protection, filters, etc. as necessary for proper operation and protection of all BCs, AAC/ASCS operator interfaces, printers, routers, gateways and other hardware and interface devices. All equipment shall be capable of handling voltage variations 10% above or below measured nominal value, with no affect on hardware, software, communications, and data storage.

34 3.05 CONTROL POWER SOURCE AND SUPPLY

A. Section 15950 Contractor shall extend all power source wiring required for operation of all equipment and devices provided under Sections 15950 through 15955 and Sequences of Operation.

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2		B.	General requirements for obtaining power include the following:
3 4 5 6			1. Obtain power from a source that feeds the equipment being controlled such that both the control component and the equipment are powered from the same panel. Where equipment is powered from a 460V source, obtain power from the electrically most proximate 120v source fed from a common origin.
7 8 9 10 11			2. Where control equipment is located inside a new equipment enclosure, coordinate with the equipment manufacturer and feed the control with the same source as the equipment. If the equipment's control transformer is large enough and of the correct voltage to supply the controls it may be used. If the equipment's control transformer is not large enough or of the correct voltage to supply the controls provide separate transformer
12 13 14 15 16 17			3. Where a controller controls multiple systems on varying levels of power reliability (normal, emergency, and/or interruptible), the controller shall be powered by the highest level of reliability served. Furthermore, the controller in that condition shall monitor each power type served to determine so logic can assess whether a failure is due to a power loss and respond appropriately. A three-phase monitor into a digital input shall suffice as power monitoring.
18			4. Standalone Functionality: Refer to Section 15953.
19	3.06	BAS ST	ART UP, COMMISSIONING AND TRAINING
20		A.	Refer to Section 15959
21	3.07	SEQUE	NCE OF OPERATION
22 23 24		A.	Refer to Section 15958 - Sequences of Operation
25 26	END O	F SECTION	N 15950

1 2 3 4		ON 159 1 - <u>GEN</u>	51 - BAS BASIC MATERIALS, INTERFACE DEVICES, AND SENSORS <u>NERAL</u>		
5	1.01	SECTION INCLUDES			
6		A.	Wiring		
7		B.	Control Valves and Actuators		
8		C.	Control Dampers and Actuators		
9		D.	Control Panels		
10		E.	Sensors		
11		F.	Flow Meter		
12		G.	Electric Control Components (Switches, Thermostats, Relays, Smoke Detectors, etc.)		
13		H.	Transducers		
14		I.	Air Flow Measuring Stations		
15		J.	Current Switches		
16		K.	Nameplates		
17		L.	Testing Equipment		
18	1.02	RELA	TED DOCUMENTS		
19		A.	Section 15050 -Basic Mechanical Materials and Methods		
20		B.	Section 15949 - Building Automation System (BAS) General		
21		C.	Section 15952 - BAS Operator Interfaces		
22		D.	Section 15953 - BAS Field Panels		
23		E.	Section 15954 - BAS Communications Devices		
24		F.	Section 15955 - BAS Software		
25		G.	Section 15958 - Sequences of Operation		
26		H.	Section 15959 – BAS Commissioning		
27	1.03	DESC	CRIPTION OF WORK		
28		A.	Refer to Section 15949 for general requirements.		
29 30		B.	Refer to other Division-15 sections for installation of instrument wells, valve bodies, and dampers in mechanical systems; not work of this section.		
31 32		C.	Provide the following electrical work as work of this section, complying with requirements of Division-16 sections:		
33 34 35			 Control wiring between field-installed controls, indicating devices, and unit control panels. Interlock wiring between electrically interlocked devices, sensors, and between a hand or auto position of motor starters as indicated for all mechanical and controls. 		

- 1 3. Wiring associated with indicating and alarm panels (remote alarm panels) and connections to their associated field devices.
 - 4. All other necessary wiring for fully complete and functional control system as specified.

4 1.04 WORK BY OTHERS

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- A. Control Valves furnished under this section shall be installed under the applicable piping section under the direction of Section 15951 Contractor who will be fully responsible for the proper operation of the valve.
 - B. Control Dampers furnished under this section shall be installed under the applicable air distribution or air handling equipment section under the direction of Section 15951 Contractor who will be fully responsible for the proper operation of the damper
 - C. Water Pressure Taps, Thermal Wells, Flow Switches, Flow Meters, etc. that will have wet surfaces, shall be installed under the applicable piping Section under the direction of Section 15951 Contractor who will be fully responsible for the proper installation and application.
 - D. Controlled Equipment Power Wiring shall be furnished and installed under Division 16. Where control involves 120V control devices controlling 120V equipment, Division 16 Contractor shall extend power wiring to the equipment. Section 15951 Contractor shall extend it from the equipment to the control device.

PART II. PART 2 - PRODUCTS

2 2.01 MATERIALS AND EQUIPMENT

- A. General: Provide electronic and electric control products in sizes and capacities indicated, consisting of valves, dampers, thermostats, clocks, controllers, sensors, and other components as required for complete installation. Except as otherwise indicated, provide manufacturer's standard materials and components as published in their product information; designed and constructed as recommended by manufacturer, and as required for application indicated.
- B. Instrument Pipe and Tube
 - 1. Hydronic and Instruments
 - a) Connection to Main Piping: Provide ½inch minimum size threadolet, ½ x 2 inch brass nipple, and ½ ball valve for connection to welded steel piping. Provide tee fitting for other types of piping.
 - b) Remote Instruments: Adapt from ball valve to specified tubing and extend to remote instruments. Provide a union or otherwise removable fitting at ball valve so that connection to main can be cleaned with straight rod. Where manifolds with test ports are not provided for instrument, provide tees with ¼" FPT branch with plug for use as test port. Adapt from tubing size to instrument connection.
 - c) Line Mounted Instruments: Extend rigid piping from ball valve to instrument. Do not use close or running thread nipples. Adapt from ball valve outlet to instrument connection size. Provide a plugged tee if pipe makes 90 degree bend at outlet of valve to allow cleaning of connection to main with straight rod without removing instrument.
 - d) Instrument Tubing: Seamless copper tubing, Type K or L, ASTM B 88; with cast-bronze solder joint fittings, ANSI B1.18; or wrought-copper solder-joint fittings, ANSI B16.22; or brass compression-type fittings. Solder shall be 95/5 tin antimony, or other suitable lead free composition solder. Tubing OD size shall be not less than the larger of ¼" or the instrument connection size.
 - Rigid Piping For Line Mounted Instruments: Schedule 40 threaded brass, with threaded brass fittings.

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2	2. Low Pressure Air Instrument Sensing Lines
3 4	 Connections: Use suitable bulkhead type fitting and static sensing tip for static pressure connections. Adapt tubing to instrument connection.
5 6	b) Tubing: Virgin polyethylene non-metallic tubing type FR, ASTM D 2737, and with flame-retardant harness for multiple tubing. Use compression or push-on brass fittings.
	Communication Wiring: All wiring shall be in accordance with National Electrical Codes and Division 16 of this specification.
9 10 11	 Contractor shall supply all communication wiring between Building Controllers, Routers, Gateways, AAC's, ASC's and local and remote peripherals (e.g., operator workstations, printers, and modems).
12 13 14	 Local Supervisory LAN: For any portions of this network required under this section of the specification, contractor shall use Fiber or Category 5 of standard TIA/EIA 68 (10BaseT). Network shall be run with no splices and separate from any wiring over thirty (30) volts.
15 16 17 18 19	3. Primary and Secondary Controller LANs: Communication wiring shall be individually 100% shielded pairs per manufacturers recommendations for distances installed, with overall PVC cover, Class 2, plenum-rated run with no splices and separate from any wiring over thirty (30) volts. Shield shall be terminated and wiring shall be grounded as recommended by BC manufacturer.
	Signal Wiring: Contractor shall run all signal wiring in accordance with National Electric Codes and Division 16 of this Specification.
22 23 24 25	 Signal wiring to all field devices, including, but not limited to, all sensors, transducers, transmitters, switches, etc. shall be twisted, 100% shielded pair, minimum 18-gauge wire, with PVC cover. Signal wiring shall be run with no splices and separate from any wiring above thirty (30) volts.
26 27	Signal wiring shield shall be grounded at controller end only unless otherwise recommended by the controller manufacturer.
	Low Voltage Analog Output Wiring: Contractor shall run all low voltage control wiring in accordance with National Electric Codes and Division 16 of this Specification.
30 31 32	 Low voltage control wiring shall be minimum 16-gauge, twisted pair, 100% shielded, with PVC cover, Class 2 plenum-rated. Low voltage control wiring shall be run with no splices separate from any wiring above thirty (30) volts.
	Control Panels: Provide control panels with suitable brackets for wall mounting for each control system. Locate panel adjacent to systems served.
35 36 37	 Fabricate panels of 16-gage furniture-grade steel, or 6063-T5 extruded aluminum alloy, totally enclosed on four sides, with hinged door and keyed lock, with manufacturer's standard shop- painted finish and color.
38	2. Provide UL-listed cabinets for use with line voltage devices.
39 40	3. Control panel shall be completely factory wired and piped, and all electrical connections made to a terminal strip. Control panel shall have standard manufacturer's color.
41	4. All gauges and control components shall be identified by means of nameplates.
42 43	5. All control tubing and wiring shall be run neatly and orderly in open slot wiring duct with cover.
	6. Complete wiring and tubing termination drawings shall be mounted in or adjacent to panel.

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2	2.02	CONTE	ROL VALVES
3 4 5 6 7 8 9		A.	General: Provide factory fabricated control valves of type, body material and pressure class indicated. Where type or body material is not indicated, provide selection as determined by manufacturer for installation requirements and pressure class, based on maximum pressure and temperature in piping system. Provide valve size in accordance with scheduled or specified maximum pressure drop across control valve. Control valves shall be equipped with heavy-duty actuators, and with proper close-off rating for each individual application. Minimum close-off rating shall be as scheduled and adequate for each application, and shall generally be considered at dead head rating of the pump.
11		B.	Plug-Type Globe Pattern for Water Service:
12 13 14 15			 Valve Sizing: Where not specifically indicated on the control drawings, modulating valves shall be sized for maximum full flow pressure drop between 50% and 100% of the branch circuit it is controlling unless scheduled otherwise. Two-position valves shall be same size as connecting piping.
16 17 18 19			 Single Seated (Two-way) Valves: Valves shall have equal-percentage characteristic for typical heat exchanger service and linear characteristic for building loop connections to campus systems unless otherwise scheduled on the drawings. Valves shall have cage-type trim, providing seating and guiding surfaces for plug on 'top-and-bottom' guided plugs.
20 21 22			 Double Seated (Three-way) Valves: Valves shall have linear characteristic. Valves shall be balanced-plug type, with cage-type trim providing seating and guiding surfaces on 'top-and- bottom' guided plugs.
23			4. Temperature Rating: 25°F minimum, 250°F maximum
24 25			5. Body: Bronze, screwed, 250 psi maximum working pressure for 1/2" to 2"; Cast Iron, flanged, 125 psi maximum working pressure for 2-1/2" and larger.
26			6. Valve Trim: Bronze; Stem: Polished stainless steel.
27			7. Packing: Spring Loaded Teflon or Synthetic Elastomer U-cups, self-adjusting.
28			8. Plug: Brass, bronze or stainless steel, Seat: Brass
29			9. Disc: Replaceable Composition or Stainless Steel Filled PTFE.
30			10. Ambient Operating Temperature Limits: -10 to 150°F (-12.2 to 66 °C)
31 32			 Acceptable Manufacturers: Subject to compliance with requirements approved manufacturers are as follows:
33			a) Johnson Controls
34			b) Invensys
35			c) Warren
36			d) Delta
37			e) Substitutions: Per Division 1
38		C.	Butterfly Type:
39 40			 Body: Extended neck epoxy coated cast or ductile iron with full lug pattern, ANSI Class 125 or 250 bolt pattern to match specified flanges.
41			Seat: EPDM, except in loop bypass applications where seat shall be metal to metal
42			3. Disc: Bronze or stainless steel, pinned or mechanically locked to shaft
43			4. Bearings: Bronze or stainless steel
44			5. Shaft: 416 stainless steel

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Cold Service Pressure: 175 psi

Close Off: Bubble-tight shutoff to 150 psi

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1 2 3		8.	Operation: Valve and actuator operation shall be smooth both seating and unseating. Should more that 2 psi deadband be required to seat/unseat the valve, valve shall be replaced at no cost to the DC Government.
4 5		9.	Acceptable Manufacturers: Subject to compliance with requirements approved manufacturers are as follows:
6			a) Jamesbury WS815
7			b) Bray Series 31
8			c) Keystone AR2
9			d) Dezurik BGS
10			e) Substitutions: Per Division 1
	ъ	5	·
11	D.		Type
12		1.	Body: Brass or bronze; one-, two-, or three-piece design; threaded ends.
13		2.	Seat: Reinforced Teflon
14 15		3. 4.	Ball: Stainless steel.
16		4. 5.	Port: Standard or 'V' style. Stem: Stainless steel, blow-out proof design, extended to match thickness of insulation.
17		5. 6.	Cold Service Pressure: 600 psi WOG
18		7.	Steam working Pressure: 150 psi
19		8.	Acceptable Manufacturers: Subject to compliance with requirements approved
20		٥.	manufacturers are as follows:
21			a) Conbraco
22			b) Worcester
23			c) Nibco
24			d) Jamesbury
25			e) PBM
26			f) Delta
27			g) Substitutions: Per Division 1
28	E.	Seg	mented or Characterized Ball Type
29		1.	Body: Carbon Steel (ASTM 216), one-piece design with wafer style ends.
30		2.	Seat: Reinforced Teflon (PTFE).
31		3.	Ball: Stainless steel ASTM A351
32		4.	Port: Segmented design with equal-percentage characteristic.
33		5.	Stem: Stainless steel.
34		6.	Cold Service Pressure: 200 psi WOG
35 36		7.	Cavitation Trim: Provide cavitation trim where indicated and/or required, designed to eliminate cavitation and noise while maintaining an equal percentage characteristic. Trim
37			shall be a series of plates with orifices to break the pressure drop into multi-stages.
38 39		8.	Acceptable Manufacturers: Subject to compliance with requirements approved manufacturers are as follows:
40			a) Jamesbury R-Series
41			b) Fisher
42			c) Substitutions: Per Division 1

2.03 CONTROL DAMPERS

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- A. General: Provide factory fabricated automatic control dampers of sizes, velocity and pressure classes as required for smooth, stable, and controllable air flow. Provide parallel or opposed blade dampers as recommended by manufacturers sizing techniques. For dampers located near fan outlets, provide dampers rated for fan outlet velocity and close-off pressure, and recommended by damper manufacturer for fan discharge damper service. Control dampers used for smoke dampers shall comply with UL 555S. Control Dampers used for fire dampers shall comply with UL 555.
 - B. For general isolation and modulating control service in rectangular ducts at velocities not greater than 1500 fpm (7.62 m/s), differential pressure not greater than 2.5" w.c. (622 Pa):
 - 1. Performance: Test in accordance with AMCA 500.
 - 2. Frames: Galvanized steel, 16-gauge minimum thickness, welded or riveted with corner reinforcement.
 - 3. Blades: Stainless steel in lab exhausts and galvanized steel elsewhere, maximum blade size 8 inches (200 mm) wide by 48 inches (1219 mm) long, attached to minimum 1/2 inch (12.7 mm) shafts with set screws, 16 gauge minimum thickness.
 - 4. Blade Seals: Synthetic elastomer, mechanically attached, field replaceable.
 - 5. Jamb Seals: Stainless steel.
 - 6. Shaft Bearings: Oil impregnated sintered bronze, graphite impregnated nylon sleeve or other molded synthetic sleeve, with thrust washers at bearings.
 - 7. Linkage: Concealed in frame.
 - 8. Linkage Bearings: Oil impregnated sintered bronze or graphite impregnated nylon.
 - 9. Leakage: Less than one percent based on approach velocity of 1500 ft./min. (7.62 m/s) and 1 inches wg. (249Pa).
 - 10. Maximum Pressure Differential: 2.5 inches wg. (622 Pa)
 - 11. Temperature Limits: -40 to 200 °F (-40 to 93 °C).
 - 12. Where opening size is larger than 48 inches (1219 mm) wide, or 72 inches (1829 mm) high, provide dampers in multiple sections, with intermediate frames and jackshafts appropriate for installation.
 - C. For general isolation and modulating control service in rectangular ducts at velocities not greater than 4000 fpm (20.3 m/s), differential pressure not greater than 6" w.c. (1493 Pa):
 - Performance: Test in accordance with AMCA 500.
 - 2. Frames: Galvanized steel, 16-gauge minimum thickness, welded or riveted with corner reinforcement.
 - 3. Blades: extruded aluminum hollow airfoil shape, maximum blade size 8 inches (200 mm) wide by 48 inches (1219 mm) long, attached to minimum 1/2 inch (12.7 mm) shafts, 14 gauge minimum extrusion thickness.
 - 4. Blade Seals: Synthetic elastomeric, mechanically attached, field replaceable.
 - 5. Jamb Seals: Stainless steel.
 - 6. Shaft Bearings: Oil impregnated sintered bronze sleeve, graphite impregnated nylon sleeve, molded synthetic sleeve, or stainless steel sleeve, with thrust washers at bearings.
 - 7. Linkage: Concealed in frame.
 - 8. Linkage Bearings: Oil impregnated sintered bronze or graphite impregnated nylon.
 - 9. Leakage: Less than 0.1 percent based on approach velocity of 4000 ft./min. (20.3 m/s) and 1 inches wg. (249Pa).
 - 10. Maximum Pressure Differential: 6 inches wg. (622 Pa)
 - 11. Temperature Limits: -40 to 200 °F (-40 to 93 °C).
- 12. Where opening size is larger than 48 inches (1219 mm) wide, or 72 inches (1829 mm) high, provide dampers in multiple sections, with appropriately intermediate frames, and jackshafts.

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9 10		4.	Shaft Bearings: Oil impregnated sintered bronze or stainless steel, pressed into frame, w thrust washers at bearings.	ith
11 12		5.	Linkage: 10-gauge minimum thickness galvanized steel clevis type crank arms, 3/16" x3/ (4.76 mm x 19 mm) minimum thickness tie rods.	4"
13		6.	Linkage Bearings: Oil impregnated sintered bronze or graphite impregnated nylon.	
14 15		7.	Leakage: Less than 0.2 percent based on approach velocity of 4000 ft./min. (20.3 m/s) a 1 inches wg. (249Pa) differential pressure.	nd
16		8.	Maximum Pressure Differential: 12 inches wg. (2984 Pa)	
17		9.	Temperature Limits: -40 to 300 °F (-40 to 149 °C).	
18 19		10.	Where opening size is larger than 48 inches (1219 mm) wide, or 72 inches (1829 mm) hig provide dampers in multiple sections, with appropriately intermediate frames, and jackshaft	
20 21 22	E.		general isolation and modulating control service in round ducts up to 40 inches in size cities not greater than 2500 fpm (12.7 m/s), differential pressure not greater than 4" w.c. (9	
23		1.	Performance: Test in accordance with AMCA 500.	
24 25		2.	Frames: rolled 12 gauge steel strip for sizes 6 inch and smaller, rolled 14 gauge steel channel for larger sizes, galvanized or aluminum finish.	el
26 27		3.	Blades: Steel construction, 12 gauge minimum thickness for dampers less than 18 inche (457 mm) in size, 10 gauge minimum thickness for larger dampers.	es
28		4.	Blade Seals: Full circumference neoprene.	
29		5.	Shaft: ½ inch (12.7 mm) diameter zinc or cadmium plated steel.	
30 31		6.	Shaft Bearings: Oil impregnated sintered bronze or stainless steel, pressed into frame, w thrust washers at bearings.	ith
32 33		7.	Leakage: Less than 0.2 percent based on approach velocity of 4000 ft./min. (20.3 m/s) a 1 inches wg. (249Pa) differential pressure.	nd
34		8.	Maximum Pressure Differential: 4 inches wg. (994 Pa)	
35		9.	Temperature Limits: -40 to 300 °F (-40 to 149 °C).	
36 37 38	F.		general isolation and modulating control service in round ducts up to 60 inches in size cities not greater than 4000 fpm (20.3 m/s), differential pressure not greater than 6" w.c. (14	
39		1.	Performance: Test in accordance with AMCA 500.	
40 41		2.	Frames: rolled 10-gauge steel channel for sizes 48 inch and smaller, rolled 3/16 inch (4. mm) thick steel channel for larger sizes, galvanized or aluminum finish.	76
42 43		3.	Blades: Steel construction, 10-gauge minimum thickness for dampers not greater than inches in size, ¼ inch (6.35 mm) minimum thickness for larger dampers.	1 8
44		4.	Blade stops: ½inch x ¼ inch (12.7 mm x 6.35 mm) full circumference steel bar.	
45		5.	Blade Seals: Full circumference neoprene.	
46		6.	Shaft: zinc or cadmium plated steel, angle reinforcing as necessary.	
47 48		7.	Shaft Bearings: Oil impregnated sintered bronze or stainless steel, pressed into frame, w thrust washers at bearings.	ith
49 50		8.	Leakage: Less than 0.4 percent based on approach velocity of 4000 ft./min. (20.3 m/s) a 1 inches wg. (249Pa) differential pressure.	nd
51		9.	Maximum Pressure Differential: 6 inches wg. (1492 Pa)	
	BAS Basic Materia	ıls, In	terface Devices, and Sensors 15951	- 8

For general isolation and modulating control service in rectangular ducts at velocities not greater

Frames: Galvanized steel, 12-gauge minimum thickness, welded or riveted with corner

Blades: Extruded aluminum hollow airfoil shape, maximum blade size 8 inches (200 mm)

wide by 48 inches (1219 mm) long, attached to minimum 3/4 inch (19 mm) shafts with set

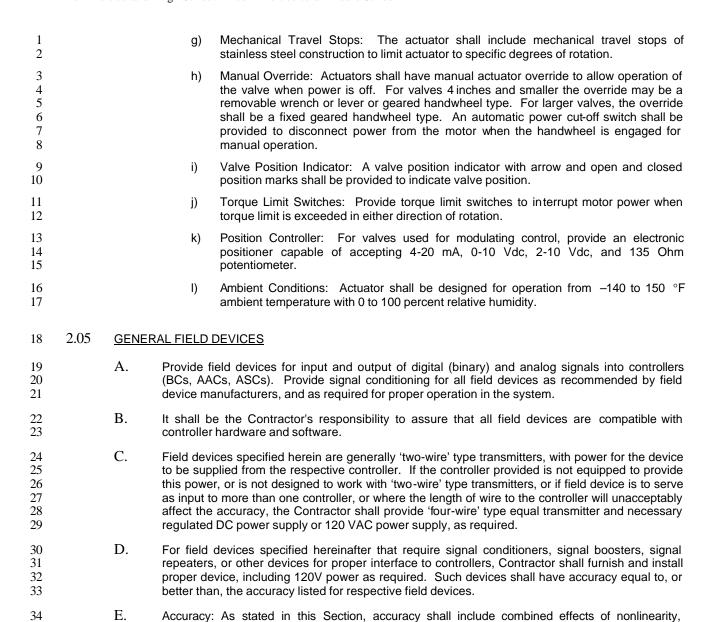
than 4000 fpm, differential pressure not greater than 12" w.c.:

Performance: Test in accordance with AMCA 500.

10. Temperature Limits: -40 to 250 °F (-40 to 121 °C).

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2 2.04 **ACTUATORS** 3 A. General: Size actuators and linkages to operate their appropriate dampers or valves with sufficient 4 reserve torque or force to provide smooth modulating action or 2-position action as specified. 5 Select spring-return actuators with manual override to provide positive shut-off of devices as they 6 are applied. 7 В. **Damper Actuators** 8 Ambient Operating Temperature Limits: -10 to 150°F (-12.2 to 66 °C) 9 Two Position Electric Actuators: Line voltage with spring return 10 Electronic Actuators: Provide actuators with spring return for two-position (24v), 0-5 Vdc, 0-10 Vdc, 2-10Vdc, 4-20 mA, or PWM input (subject to restrictions) as required. Actuators 11 12 shall travel full stroke in less than 90 seconds. Actuators shall be designed for a minimum of 60,000 full cycles at full torque and be UL 873 listed. Provide stroke indicator. Actuators 13 shall have positive positioning circuit. Where two actuators are required in parallel or in 14 sequence provide an auxiliary actuator driver. Actuators shall have current limiting motor 15 16 protection. Actuators shall have manual override where indicated. Modulating actuators for 17 valves shall have minimum rangeability of 40 to 1. 18 Close-Off Pressure: Provide the minimum torque required, and spring return for fail 19 positioning (unless otherwise specifically indicated) sized for required close-off 20 pressure. Required close-off pressure for two-way water valve applications shall be the 21 shutoff head of associated pump. Required close-off rating of steam valve applications 22 shall be design inlet steam pressure plus 50 percent for low pressure steam, and 10 23 percent for high pressure steam. Required close-off rating of air damper applications 24 shall be shutoff pressure of associated fan, plus 10 percent. 25 Acceptable Manufacturers: Subject to compliance with requirements approved 26 manufacturers are as follows: 27 1) Belimo 28 2) Johns on Controls 3) 29 Delta 30 4) Invensys 5) 31 Substitutions: Per Division 1 C. 32 Quarter-Turn Actuators (for ball and butterfly valves): 33 Electric 34 Motor: Suitable for 120 or 240 Volt single-phase power supply. Insulation shall be a) 35 NEMA Class F or better. Motor shall be rated for 100 percent duty cycle. Motors shall 36 have inherent overload protection. 37 Gear Train. Motor output shall be directed to a self locking gear drive mechanism. 38 Gears shall be rated for torque input exceeding motor locked rotor torque. 39 Wiring: Power and control wiring shall be wired to a terminal strip in the actuator c) 40 enclosure 41 Failsafe Positioning: Actuators shall be spring return type for failsafe positioning. d) 42 Enclosure: Actuator enclosure shall be NEMA-4 rated, and shall have a minimum of e) two threaded conduit entries. Provide an enclosure heater for actuators located 43 44 outside of buildings. 45 Limit Switches: Travel limit switches shall be UL and CSA approved. Switches shall f) 46 limit actuator in both open and closed positions.



2.06 <u>TEMPERATURE SENSORS (TS)</u>

nonrepeatability and hysteresis.

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- A. Sensor range: When matched with A/D converter of BC, AAC/ASC, or SD, sensor range shall provide a resolution of no worse than 0.3°F (0.16 °C) (unless noted otherwise). Where thermistors are used, the stability shall be better than 0.25°F over 5 years.
 - B. Matched Sensors: The following applications shall require matched sensors:
 - 1. Hydronic Temperature Difference Calculations: Provide matched supply and return temperature sensors where the pair is used for calculating temperature difference for use in load calculations or sequencing such as across chillers and plants.
 - Air Handling Unit Sequencing: Provide matched pair for the cooling and heating coil leaving sensors where the sequence includes calculating an offset from the supply air setpoint to maintain a leaving heating coil temperature.
- C. Room Temperature Sensor: Shall be an element contained within a ventilated cover, suitable for wall mounting. Provide insulated base. Following sensing elements are acceptable:

1 2			1. Sensing element shall be platinum RTD, thermistor, or integrated circuit, +/- 0.4°F accuracy at calibration point.
3 4			2. Provide setpoint adjustment where indicated. The setpoint adjustment shall be a warmer/cooler indication that shall be scalable via the BAS.
5 6			3. Provide an occupancy override button on the room sensor enclosure where indicated. This shall be a momentary contact closure
7			4. Provide current temperature indication via an LCD or LED readout where indicated.
8 9 10		D.	Single-Point Duct Temperature Sensor: Shall consist of sensing element, junction box for wiring connections and gasket to prevent air leakage or vibration noise. Temperature range as required for resolution indicated in paragraph A. Sensor probe shall be 316 stainless steel.
11 12			1. Sensing element shall be platinum RTD, thermistor, or integrated circuit, +/- $0.2^{\circ}F$ accuracy at calibration point
13 14 15 16		E.	Averaging Duct Temperature Sensor: Shall consist of an averaging element, junction box for wiring connections and gasket to prevent air leakage. Provide sensor lengths and quantities to result in one lineal foot of sensing element for each three square feet of cooling coil/duct face area. Temperature range as required for resolution indicated in paragraph A.
17 18			1. Sensing element shall be platinum RTD, or thermistor, +/- 0.2°F accuracy at calibration point.
19 20		F.	Liquid immersion temperature sensor shall include brass thermowell, sensor and connection head for wiring connections. Temperature range shall be as required for resolution of $0.15^{\circ}F$.
21 22			1. Sensing element (chilled water/glycol systems) shall be platinum RTD +/- 0.2°F accuracy at calibration point. Temperature range shall be as required for resolution of 0.15°F.
23 24 25			2. Sensing element (other systems) shall be platinum RTD, thermistor, or integrated circuit, +/- 0.4°F accuracy at calibration point. Temperature range shall be as required for resolution of 0.3°F.
26 27 28		G.	Outside air sensors shall consist of a sensor, sun shield, utility box, and watertight gasket to prevent water seepage. Temperature range shall be as require for resolution indicated in Paragraph A
29 30			1. Sensing element shall be platinum RTD, thermistor, or integrated circuit, +/- $0.4^{\circ}F$ accuracy at calibration point.
31	2.07	<u>TEMPE</u>	RATURE TRANSMITTERS
32 33 34 35		A.	Where required by Controller, or where wiring runs are over 50 feet, sensors as specified above may be matched with transmitters outputting 4-20 mA linearly across the specified temperature range. Transmitters shall have zero and span adjustments, an accuracy of $0.1^{\circ}F$ when applied to the sensor range.
36	2.08	<u>HUMIDI</u>	TY TRANSMITTERS
37 38 39 40 41 42		A.	Units shall be suitable for duct, wall (room) or outdoor mounting. Unit shall be two-wire transmitter utilizing bulk polymer resistance change or thin film capacitance change humidity sensor. Unit shall produce linear continuous output of 420 mA for percent relative humidity (% RH). A combination temperature and humidity sensor may be used for zone level monitoring. Sensors shall have the following minimum performance and application criteria:

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2			1. Input Range: 0 to 100% RH.
3 4 5			 Accuracy(% RH): +/- 2% (when used for enthalpy calculation, dewpoint calculation or humidifier control) or +/- 3% (monitoring only) between 20-90% RH at 77°F, including hysteresis, linearity, and repeatability.
6			3. Sensor Operating Range: As required by application
7			4. Long Term Stability: Less than 1% drift per year.
8 9		B.	Acceptable Manufacturers: Units shall be Vaisala HM Series, General Eastern, Microline, or Hy-Cal HT Series. Substitutions shall be allowed per Division 1.
10	2.09	DIFFE	ERENTIAL PRESSURE TRANSMITTERS (DP)
11 12 13 14 15		A.	General Purpose - Water: Two-wire transmitter, 4-20 mA output with zero and span adjustments. Plus or minus 0.5% overall accuracy, 450 psig (3103 KPa) maximum static pressure rating, 200 psid maximum overpressure rating for 6 through 60 psid range, 450 psid for 100 through 300 psid range. Acceptable units shall be Kele & Associates Model 360 C. Substitutions shall be allowed per Division 1.
16		B.	Industrial Application, Liquid and Gas:
17 18			 General: Two-wire smart DP cell type transmitter, 4-20 mA or 1-5 Vdc user-selectable linear or square root output, adjustable span and zero, stainless steel wetted parts.
19			2. Environmental limits: -40 to 250 °F (-40 to 121 °C), 0 to 100% RH
20			3. Accuracy: less than 0.1 percent of span.
21			4. Output Damping: Time constant user selectable from 0 to 36 seconds.
22 23			5. Vibration Effect: Less than $\pm 0.1\%$ of upper range limit from 15 to 2000 Hz in any axis relative to pipe mounted process conditions.
24			6. Electrical Enclosure: NEMA-4, -4X, -7, -9.
25			7. Approvals: FM, CSA.
26 27			 Acceptable Manufacturers: Rosemount Inc. 3051 Series, Foxboro, Johnson-Yokagawa, Setra, or Mamac. Substitutions shall be allowed per Division 1.
28 29		C.	General Purpose Low Pressure Air: Generally for use in static measurement of duct pressure or constant volume air velocity pressure measurement where the range is applicable.
30			General: Loop powered two-wire differential capacitance cell-type transmitter.
31			2. Output: two wire 4-20 mA output with zero adjustment.
32			3. Overall Accuracy: Plus or minus 1%.
33			4. Minimum Range: 0.1 in. w.c.
34			5. Maximum Range: 10 inches w.c.
35			6. Housing: Polymer housing suitable for surface mounting.
36			7. Acceptable Manufacturers: Modus T30. Substitutions shall be allowed per Division 1.
37 38			Static Sensing Element: Pitot-type static pressure sensing tips similar to Dwyer model A-301 and connecting tubing.
39			9. Range: Select for specified setpoint to be between 25% and 75% full-scale.
40 41 42		D.	General Purpose Low Pressure/Low Differential Air: Generally for use in static measurement of space pressure or constant volume air velocity pressure measurement where the range is applicable.
43			General: Loop powered, two-wire differential capacitance cell type transmitter.

Output: Two-wire 4-20 mA output with zero adjustment.

Overall Accuracy: Plus or minus 1%.

Maximum Range: 0.1, 0.25, or 0.5 inches w.c.

Minimum Range: 0 in. w.c.

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- 1 6. Housing: Polymer housing suitable for surface mounting.
- Acceptable Manufacturers: Modus T30. Substitutions shall be allowed per Division 1.
 - 8. Static Sensing Element: Pitot-type static pressure sensing tips similar to Dwyer model A-301 and connecting tubing.
 - 9. Range: Select for specified setpoint to be between 25% and 75% full-scale.
 - E. VAV Velocity Pressure: Generally for use in variable volume air velocity pressure measurement where the range is applicable.
 - 1. General: Loop powered two-wire differential capacitance cell type transmitter.
 - 2. Output: Two-wire, 4-20 mA output with zero adjustment.
 - 3. Overall Accuracy: Plus or minus 0.25%
 - 4. Minimum Range: 0 in. w.c.

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- 5. Maximum Range: 1 inch w.c.
- 6. Housing: Polymer housing suitable for surface mounting.
- Acceptable Manufacturers: Setra. Substitutions shall be allowed per Division 1.
 - 8. Range: Select for minimum range that will accept the maximum velocity pressure expected.

16 2.10 VALVE BYPASS FOR DIFFERENTIAL PRESSURE SENSORS

A. Provide a five valve bypass kit for protection of DP sensors where the static on the pipe can cause on over pressure when connected to one port with the other at atmospheric pressure. Kit shall include high and low pressure isolation valves, high and low pressure vent valves, and a bypass valve contained in a NEMA-1 enclosure.

21 2.11 <u>DIFFERENTIAL PRESSURE SWITCHES (DPS)</u>

- A. General Service Air: Diaphragm with adjustable setpoint and differential and snap acting form C contacts rated for the application. Provide manufacturer's recommended static pressure sensing tips and connecting tubing
- B. General Service Water: Diaphragm with adjustable setpoint, 2 psig or adjustable differential, and snap-acting Form C contacts rated for the application. 60 psid minimum pressure differential range. 0°F to 160°F operating temperature range.

28 2.12 PRESSURE SWITCHES (PS)

- A. Diaphragm or bourdon tube with adjustable setpoint and differential and snap-acting Form C contacts rated for the application. Pressure switches shall be capable of withstanding 150% of rated pressure.
- B. Acceptable Manufacturers: Square D, ITT Neo-Dyn, ASCO, Penn, Honeywell, and Johnson Controls. Substitutions shall be allowed per Division 1.

34 2.13 TRANSDUCERS

- A. Binary to Analog Transducers (Pulse Width Modulating or Tri-State-to-Voltage or -Current):
 - Adjustable zero and span.
 - Failure Mode on Power Loss: Shall be provided with memory feature to allow the transducer to return to last value on power failure.
 - Accuracy: ± 1% of span
 - 4. Output Span: 4-20 mA, 0-5 Vdc, 1-5 Vdc, 0-10Vdc, 2-10Vdc, 0-15Vdc, 3-15Vdc
 - 5. Input: 4-20 mA, pulse width modulated or tri-state input.
 - 6. Pulse Width Modulated and Tri-state Input Time Base: Dip switch selectable.
- 43 7. Enclosure: Polymer designed for surface or panel mount.

Failure Mode on Power Loss: Non-failsafe transducers shall have no output air loss. 1 2 Failsafe transducers shall exhaust output upon power loss. 3 9. Acceptable Manufacturers: RE Technologies Model PWA Series. Substitutions shall be 4 allowed per Division 1. 5 В. Electronic-to Electronic (Voltage or Current to Current or Voltage): 6 Adjustable zero and span. 7 Failure Mode on Power Loss: Memory feature to allow the transducer to return to last value 8 on power failure. 9 3. Accuracy: ± 1% of span. 10 4. Output Span: 4-20 mA, 0-5 Vdc, 1-5 Vdc, 0-10 Vdc, 2-10 Vdc, 0-15 Vdc, 3-15 Vdc. 11 5. Input: 0-20 Vdc, 0-20 ma, 0-10 kOhm. 12 6. Pulse Width Modulated and Tri-state Input Time Base: Dip switch selectable 7. Enclosure: Polymer enclosure designed for surface or panel mount. 13 14 Acceptable Manufacturers: RE Technologies Model PWA Series. Substitutions shall be 15 allowed per Division 1. 16 2.14 **CURRENT SWITCHES (CS)** 17 A. Clamp-On or Solid-Core Design Current Operated Switch (for Constant Speed Motor Status 18 Indication) 19 1. Range: 1.5 to 150 amps. 20 2. Trip Point: Adjustable. 21 3. Switch: Solid state, normally open, 1 to 135 Vac or Vdc, 0.3 Amps. Zero off state leakage. 22 4. Lower Frequency Limit: 6 Hz. 23 5. Trip Indication: LED 24 6. Approvals: UL, CSA 25 7. Max. Cable Size: 350 MCM 26 8. Acceptable Manufacturers: Veris Industries H-708/908; Inc., RE Technologies SCS1150A-27 LED. Substitutions shall be allowed per Division 1. 28 В. Clamp-on or Solid-Core Wire Through Current Switch (CS/CR) (for Constant Speed Motors): 29 Same as CS with 24v command relay rated at 5A @ 240 Vac resistive, 3A @ 240 Vac inductive, 30 load control contact power shall be induced from monitored conductor (minimum conductor 31 current required to energize relay 5A, max, rating of 135A). Acceptable Manufacturers shall be 32 Veris Industries, Inc., Model # H938/735; or RE Technologies RCS 1150. Substitutions shall be 33 allowed per Division 1. 34 Where used for single-phase devices, provide the CS/CR in a self-contained unit in a 35 housing similar with override switch to Kele RIBX. Substitutions shall be allowed per 36 Division 1. C. 37 Clamp-On Design Current Operated Switch for Variable Speed Motor Status Indication 38 Range: 1.5 to 135 Amps. 39 Trip Point: Self-calibrating based on VA memory associated with frequency to detect loss of 40 belt with subsequent increase of control output to 60 Hz. 41 3. Switch: Solid state, normally open, 1 to 135 Vac or Vdc, 0.3 Amps. Zero off state leakage. 42 4. Frequency Range: 5-75 Hz 43 5. Trip Indication: LED

Acceptable Manufacturers: Veris Industries, Inc. H-904. Substitutions shall be allowed per

Approvals: UL, CSA

Division 1.

Max. Cable Size: 350 MCM

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- D. Clamp-On Wire Through Current Switch (CS/CR) (for Variable Speed Motors): Same as CS with 24v command relay rated at 5A @ 240 Vac resistive, 3A @ 240 Vac inductive, load control contact power shall be induced from monitored conductor (minimum conductor current required to energize relay 5A, max. rating of 135A). Acceptable manufacturer shall be Veris Industries, Inc., Model # H934. Substitutions shall be allowed per Division 1.
 - E. Variable Speed Status: Where current switches are used to sense the status for variable speed devices, the CT shall include on-board VA/Hz memory to allow distinction between a belt break and subsequent ramp up to 60 Hz, versus operation at low speed. The belt break scenario shall be indicated as a loss of status and the operation at low speed shall indicate normal status.

10 2.15 <u>CURRENT TRANSFORMERS (CT)</u>

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- A. Clamp-On Design Current Transformer (for Motor Current Sensing)
- 12 1. Range: 1-10 amps minimum, 20-200 amps maximum
 - Trip Point: Adjustable
 - Output: 0-5 VDC.
 - 4. Accuracy: ±0.2% from 20 to 100 Hz.
 - 5. Acceptable Manufacturers: KELE SA100. Substitutions shall be allowed per Division 1.

17 2.16 CONTINUOUS LEVEL TRANSMITTERS

- 18 A. Capacitance Type
 - 1. Provide a loop powered, continuous capacitance type level transmitter with adjustable span and zero.
 - Output: 4-20 mA.
- 22 3. Probe: Fluoropolymer coated stainless steel rod or cable. Provide cable probe with end attachment hardware or weight.
 - Electrical Enclosure: NEMA-4, -7.
- Approvals: UL or CSA.
 - 6. Accuracy: ±1% of calibrated span.
 - 7. Process Connection: MPT or ANSI Flange as required.
 - 8. Acceptable Manufacturers: Drexelbrook, Endress & Hauser. Substitutions shall be allowed per Division 1.
- 30 B. Hydrostatic Pressure
 - Two wire smart d/p cell type transmitter
 - 2. 4-20 mA or 1 to 5 volt user selectable linear or square root output
 - Adjustable span and zero
 - 4. Stainless steel wetted parts
 - 5. Environmental limits: -40 to 250 °F (-40 to 121 °C), 0 to 100% RH
 - 6. Accuracy: less than 0.1 percent of span
 - 7. Output Damping: time constant user selectable from 0 to 36 seconds
 - 8. Vibration Effect: Less than ±0.1% of upper range limit from 15 to 2000 Hz in any axis relative to pipe mounted process conditions.
 - 9. Electrical Enclosure: NEMA 4, 4X, 7, 9
- 41 10. Approvals: FM, CSA
- 42 11. Acceptable Manufacturers: Rosemount Inc. 3051 Series, Foxboro, and Johnson-Yokagawa. Substitutions shall be allowed per Division 1.

2.17 <u>INSERTION TYPE TURBINE METER FOR WATER SERVICE</u>

- 2 Α. Turbine Insertion Flow Meter sensing method shall be impedance sensing (iron magnetic and non-photoelectric), with volumetric accuracy of +/- 2% of reading over middle 80% of operating 3 range, and +/- 4% of reading over the entire operating range. Turbine Insertion Flow Meter shall 4 5 have maximum operating pressure of 400 psi and maximum operating temperature of 200°F continuous (220°F peak). All wetted metal parts shall be constructed of 316 stainless steel. Flow 6 meter shall meet or exceed all of the accuracy, head loss, flow limits, pressure and material 7 requirements of the AWWA standard C704-70 for the respective pipe or tube size. Analog outputs 8 9 shall consist of non-interactive zero and span adjustments, a DC linearly of 0.1% of span, voltage 10 output of 0-10 V, and current output of 4-20 mA.
 - 1. Install in water systems with a minimum of 10 pipe diameters unobstructed flow. Double turbine insertion required at between 10 and 4 diameters unobstructed flow.
 - Acceptable Manufacturers: Onicon Corp. and Hersey. Substitutions shall be allowed per Division 1.

15 2.18 <u>AIRFLOW MEASURING STATIONS (AFMS)</u>

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- A. Vortex Shedding Grid: Provide an array of vortex shedding elements designed to produce stable 'Karmen Vortices' that are linear with air velocity. Provide the electronics to totalize the pulses and output average velocity proportional to an output signal of 4-20ma.
 - 1. Sensor Accuracy: ±1.5%
- 20 2. Electronics Accuracy: ±0.5%
 - 3. Range: Select minimum range to accommodate the expected flow range of the project
- 22 4. Temperature Limits: 20-140°F
 - Acceptable Manufacturer: Tek-Air Systems Inc. 'Vortek' Model. Substitutions shall be allowed per Division 1.

25 2.19 AIR VELOCITY PRESSURE SENSORS (INSERTION TYPE)

A. Single or Multi-Point Averaging (as indicated): Sensing tip shall be for insertion into duct with mounting flange and push on tube connections. Material shall be suitable to the application.

28 2.20 CO₂ SENSORS/TRANSMITTERS (CO2)

- A. CO₂ sensors shall use silicon based, diffusion aspirated, infrared single beam, dual-wavelength sensor.
- 31 B. Accuracy: ±36ppm at 800 ppm and 68°F.
- 32 C. Stability: 5% over 5 years.
 - D. Output: 4-20 mA, 0-10 Vdc or relay.
- 34 E. Mounting: Duct or Wall as indicated.
- F. Acceptable Manufacturer: Vaisala, Inc. GMD20 (duct) or GMW20 (wall).

36 2.21 ELECTRIC CONTROL COMPONENTS

A. Limit Switches (LS): Limit switches shall be UL listed, SPDT or DPDT type, with adjustable trim arm. Limit switches shall be as manufactured by Square D, Allen Bradley. Substitutions shall be allowed per Division 1.

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2 3 4 5 6	В.	Low Temperature Detector ('Freezestat') (FZ): Low temperature detector shall consist of a 'cold spot' element which responds only to the lowest temperature along any one foot of entire element, minimum bulb size of 1/8" x 20' (3.2mm x 6.1m), junction box for wiring connections and gasket to prevent air leakage or vibration noise, DPST (4 wire, 2 circuit) with manual reset. Temperature range 15 to 55°F (-9.4 to 12.8 °C), factory set at 38°F.
7 8 9	C.	Surface-Mounted Thermostat: Surface-mounted thermostat shall consist of SPDT contacts, operating temperature range of 50 to 150° F (10 to 65° C), and a minimum 10° F fixed setpoint differential.
10 11 12	D.	Low Voltage Wall Thermostat: Wall-mounted thermostat shall consist of SPDT sealed mercury contacts, operating temperature range of 50 to 90°F (10 to 32°C), switch rating of 24 Vac (30 Vac max.), and both manual and automatic fan operation in both the heat and cool modes.
13 14	E.	Control Relays: All control relays shall be UL listed, with contacts rated for the application, and mounted in minimum NEMA-1 enclosure for indoor locations, NEMA-4 for outdoor locations.
15 16		 Control relays for use on electrical systems of 120 volts or less shall have, as a minimum, the following:
17		a) AC coil pull-in voltage range of +10%, -15% or nominal voltage.
18		b) Coil sealed volt-amperes (VA) not greater than four (4) VA.
19 20		 Silver cadmium Form C (SPDT) contacts in a dustproof enclosure, with 8 or 11 pin type plug.
21		d) Pilot light indication of power-to-coil and coil retainer clips.
22		e) Coil rated for 50 and 60 Hz service.
23 24		 f) Acceptable Manufacturers: Relays shall be Potter Brumfield, Model KRPA. Substitutions shall be allowed per Division 1.
25 26 27		 Relays used for across-the-line control (start/stop) of 120V motors, 1/4 HP, and 1/3 HP, shall be rated to break minimum 10 Amps inductive load. Relays shall be IDEC. Substitutions shall be allowed per Division 1.
28 29		 Relays used for stop/start control shall have low voltage coils (30 VAC or less), and shall be provided with transient and surge suppression devices at the controller interface.
30 31 32	F.	General Purpose Power Contactors: NEMA ICS 2, AC general-purpose magnetic contactor. ANSI/NEMA ICS 6, NEMA type 1enclosure. Manufacturer shall be Square 'D', Cutler-Hammer or Westinghouse.
33 34 35 36	G.	Control Transformers: Furnish and install control transformers as required. Control transformers shall be machine tool type, and shall be US and CSA listed. Primary and secondary sides shall be fused in accordance with the NEC. Transformer shall be proper size for application, and mounted in minimum NEMA-1 enclosure.
37 38		 Transformers shall be manufactured by Westinghouse, Square 'D', or Jefferson. Substitutions shall be allowed per Division 1.
39 40 41	Н.	Time Delay Relays (TDR): TDRs shall be capable of on or off delayed functions, with adjustable timing periods, and cycle timing light. Contacts shall be rated for the application with a minimum of two (2) sets of Form C contacts, enclosed in a dustproof enclosure.
42		1. TDRs shall have silver cadmium contacts with a minimum life span rating of one million

I. Electric Push Button Switch: Switch shall be momentary contact, oil tight, push button, with number of N.O. and/or N.C. contacts as required. Contacts shall be snap-action type, and rated for minimum 120 Vac operation. Switch shall be 800T type, as manufactured by Allen Bradley. Substitutions shall be allowed per Division 1.

operations. TDRs shall have solid state, plug-in type coils with transient suppression

TDRs shall be UL and CSA listed, Crouzet type. Substitutions shall be allowed per Division

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- J. Pilot Light: Panel-mounted pilot light shall be NEMA ICS 2 oil tight, transformer type, with screw terminals, push-to-test unit, LED type, rated for 120 VAC. Unit shall be 800T type, as manufactured by Allen-Bradley. Substitutions shall be allowed per Division 1.
- 4 K. Alarm Horn: Panel-mounted audible alarm horn shall be continuous tone, 120 Vac Sonalert solid-5 state electronic signal, as manufactured by Mallory. Substitutions shall be allowed per Division 1.
 - L. Electric Selector Switch (SS): Switch shall be maintained contact, NEMA ICS 2, oil-tight selector switch with contact arrangement, as required. Contacts shall be rated for minimum 120 Vac operation. Switch shall be 800T type, as manufactured by Allen-Bradley. Substitutions shall be allowed per Division 1.

10 2.22 NAMEPLATES

- A. Provide engraved phenolic or micarta nameplates for all equipment, components, and field devices furnished. Nameplates shall be 1/8 thick, black, with white center core, and shall be minimum 1" x 3", with minimum 1/4" high block lettering. Nameplates for devices smaller than 1" x 3" shall be attached to adjacent surface.
- B. Each nameplate shall identify the function for each device.

16 2.23 TESTING EQUIPMENT

A. Contractor shall test and calibrate all signaling circuits of all field devices to ascertain that required digital and accurate analog signals are transmitted, received, and displayed at system operator terminals, and make all repairs and recalibrations required to complete test. Contractor shall be responsible for test equipment required to perform these tests and calibrations. Test equipment used for testing and calibration of field devices shall be at least twice as accurate as respective field device (e.g., if field device is +/-0.5% accurate, test equipment shall be +/-0.25% accurate over same range).

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PART III. PART 3 - EXECUTION

26 3.01 INSPECTION

A. Examine areas and conditions under which control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

29 3.02 INSTALLATION OF CONTROL SYSTEMS

- A. General: Install systems and materials in accordance with manufacturer's instructions, roughingin drawings and details shown on drawings. Install electrical components and use electrical products complying with requirements of National Electric Code and all local codes.
- B. Control Wiring: The term "control wiring" is defined to include providing of wire, conduit and miscellaneous materials as required for mounting and connection of electric control devices.
 - Wiring System: Install complete wiring system for electric control systems. Conceal wiring except in mechanical rooms and areas where other conduit and piping are exposed. Installation of wiring shall generally follow building lines. Install in accordance with National Electrical Code and Division 16 of this Specification. Fasten flexible conductors bridging cabinets and doors, neatly along hinge side, and protect against abrasion. Tie and support conductors neatly.
 - 2. Control Wiring Conductors: Install control wiring conductors, without splices between terminal points, color-coded. Install in neat workmanlike manner, securely fastened. Install in accordance with National Electrical Code and Division 16 of this Specification.

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 - Supply Duct Pressure Transmitters:

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- Communication wiring, signal wiring and low voltage control wiring shall be installed separate from any wiring over thirty (30) volts. Signal wiring shield shall be grounded at controller end only, unless otherwise recommended by the controller manufacturer.
- All WAN and LAN Communication wiring shield shall be terminated as recommended by controller manufacturer. All WAN and LAN Communication wiring shall be labeled with a network number, device ID at each termination and shall correspond with the WAN and LAN system architecture and floor plan submittals.
- Install all control wiring external to panels in electric metallic tubing or raceway. However, communication wiring, signal wiring and low voltage control wiring may be run without conduit in concealed, accessible locations if noise immunity is ensured. Contractor will be fully responsible for noise immunity and rewire in conduit if electrical or RF noise affects performance. Accessible locations are defined as areas inside mechanical equipment enclosures, such as heating and cooling units, instrument panels etc.; in accessible pipe chases with easy access, or suspended ceilings with easy access. Installation of wiring shall generally follow building lines. Run in a neat and orderly fashion, bundled where applicable, and completely suspended (strapped to rigid elements or routed through wiring rings) away from areas of normal access. Tie and support conductors neatly with suitable nylon ties. Conductors shall not be supported by the ceiling system or ceiling support system. Conductors shall be pulled tight and be installed as high as practically possible in ceiling cavities. Wiring shall not be laid on the ceiling or duct. Conductors shall not be installed between the top cord of a joist or beam and the bottom of roof decking. Contractor shall be fully responsible for noise immunity and rewire in conduit if electrical or RF noise affects performance.
- Number-code or color-code conductors appropriately for future identification and servicing of control system. Code shall be as indicated on approved installation drawings.
- C. Control Valves: Install so that actuators, wiring, and tubing connections are accessible for maintenance. Where possible, install with valve stem axis vertical, with operator side up. Where vertical stem position is not possible, or would result in poor access, valves may be installed with stem horizontal. Do not install valves with stem below horizontal, or down.
- D. Freezestats: Install freezestats in a serpentine fashion where shown on drawing. Provide one foot of element for each square foot of coil face area. Where coil face area exceeds required length of element, provide multiple devices, wired in parallel for normally open close on trip application, wired in series for normally closed, open on trip application. Adequately support with coil clips.
- E. Averaging Temperature Sensors: Cover no more than two square feet per linear foot of sensor length except where indicated. Generally where flow is sufficiently homogeneous/adequately mixed at sensing location, consult AE for requirements.
- F. Airflow Measuring Stations: Install per manufacturer's recommendations in an unobstructed straight length of duct (except those installations specifically designed for installation in fan inlet). For installations in fan inlets, provide on both inlets of double inlet fans and provide inlet cone adapter as recommended by AFM station manufacturer.
- G. Fluid Flow Sensors: Install per manufacturer's recommendations in an unobstructed straight length of pipe.
- H. Relative Humidity Sensors: Provide element guard as recommended by manufacturer for high velocity installations. For high limit sensors, position remote enough to allow full moisture absorption into the air stream before reaching the sensor.
- I. Differential Pressure Transmitters: Provide valve bypass arrangement to protect against over pressure damaging the transmitter.
- J. Flow Switches: Where possible, install in a straight run of pipe at least 15 diameters in length to minimize false indications.
- K. Current Switches for Motor Status Monitoring: Adjust so that setpoint is below minimum operating current and above motor no load current.
- BAS Basic Materials, Interface Devices, and Sensors KCI/SHW Joint Venture

1 2 3 4			 General: Install pressure tips with at least 4 'round equivalent' duct diameters of straight duct with no takeoffs upstream. Install pressure tips securely fastened with tip facing upstream in accordance with manufacturer's installation instructions. Locate the transmitter at an accessible location to facilitate calibration.
5 6			VAV System 'Down-Duct' Transmitters: Locate pressure tips approximately 2/3 of the hydraulic distance to the most remote terminal in the air system.
7 8 9		M.	Cutting and Patching Insulation: Repair insulation to maintain integrity of insulation and vapor barrier jacket. Use hydraulic insulating cement to fill voids and finish with material matching or compatible with adjacent jacket material.
10	3.03	REFRIC	GERANT MONITOR
11 12		A.	Install in accordance with the manufacturer's instructions. Place sensing tips in locations to maximize effectiveness.
13		B.	Hard wire interlocks to the emergency ventilation and shutdown of combustion devices.
14			
15 16	END O	F SECTION	ON 15951

1 2	SECTI	CTION 15952 - BAS OPERATOR INTERFACES			
3	PART	I.	PART 1 - GENERAL		
4	1.01	SECT	TION INCLUDES		
5		A.	Operator Workstation		
6		B.	Control System Servers		
7		C.	Portable Operator Terminal		
8		D.	Printers		
9	1.02	RELA	TED DOCUMENTS		
10		A.	15050 -Basic Mechanical Materials and Methods		
11 12		B.	15949 - Building Automation System (BAS) General (Refer to this Section also for Definitions and Abbreviations)		
13		C.	15951 - BAS Basic Materials, and Devices		
14		D.	15953 - BAS Field Panel		
15		E.	15954 - BAS Communications Devices		
16		F.	15955 - BAS Software and Programming		
17		G.	15958 - Sequences of Operation		
18		H.	15959 – BAS Commissioning		
19	1.03	DESC	RIPTION OF WORK		
20 21 22		A.	Furnish and install all Operator Interfaces and Control System Servers as required for the BAS functions specified. All computers shall be warranted by the manufacturer for a period of one year after final acceptance.		
23		B.	Refer to Section 15949 for general requirements.		
24	PART	II.	PART 2 - PRODUCTS		
25	2.01	<u>OPER</u>	RATOR WORKSTATION (OWS)		
26 27 28 29 30		A.	Provide personal computer (PC's) with Intel Pentium 4 processor operating at 2.4 GHz minimum speed. Include 512 MB RAM and minimum of two (2) 40GB/7200 RPM hard dsk drives. Provide a 4X AGP graphics card, 3.5-inch high-density floppy disk drive, Four USB ports, 100 base T network card and 16X/10X/40X CD-RW Drive. Provide 19 in (17.9 in viewable, .2525AG) Monitor		

- B. Provide an uninterruptible power supply system providing battery backup for each operator workstation and peripheral devices. UPS shall protect against blackouts, brownouts, surges and noise. UPS shall include LAN port and modem line surge protection. UPS shall be sized for a 7-minute full load runtime, 23-minute ½ load runtime, with a typical runtime of up to 60 minutes. Transfer time shall be 2-4 milliseconds. UPS shall provide a 480-joule suppression rating, and current suppression protection for 36,000 amps and provide 90% recharge capability in 2-4 hours. Suppression response time shall be instantaneous. UPS low voltage switching shall occur when supply voltage is less than 94 volts. UPS shall be provided with modem surge suppression and LAN port connections. Provide all software, cables, peripherals etc. for a complete system.
- C. Provide detachable keyboard with standard typewriter layout, function keys, and separate numeric keypad. Provide a USB mouse and mouse pad with the system. Provide one open serial port after configuration of the workstation to meet the requirements of the rest of these specifications.
 - D. Workstation PC shall have the capability of changing serial port interrupt vectors and IOBASE addresses through software.
 - E. Operating system for operator workstation shall be Microsoft 'Windows 2000 Professional'. Provide Microsoft Office 2000 Professional or Office XP Professional Software. All software shall be at least the latest version available as of the date of contract completion.
- 21 F. Provide software, graphics and programming as specified in Section 15955.
- G. Provide network card approved by BAS manufacturer to support Supervisory LAN communications (100 Mbps Ethernet TCP/IP) for OWSs connected to the Local Supervisory LAN and network card or LANID where connected to the Primary Controller LAN.
 - H. Provide 'PC Anywhere' software by Symantec Corporation.
- I. Provide additional hardware, video drivers, etc., to facilitate all control functions and software requirements specified for the BAS.
 - J. Operator Workstation shall be located as directed by the DC Government.

29 2.02 CONTROL SYSTEM SERVER (CSS)

- A. Provide personal computer (PC) or server computer with Intel Pentium 4 processor operating at 2.8 GHz minimum speed. Include 1GB RAM and minimum of two (2) 100 GB/7200 RPM hard disk drives. Provide a 4X AGP graphics card, 3.5-inch high-density floppy disk drive, Four USB ports, 100 Base-T network card, 16X/10X/40X CD-RW Drive, 56k modem and backup system with capacity to store all aspects of the system configuration database including control device configuration parameters, graphics, trends, and programming, etc to a single removable portable device which can be moved off site. Provide 19 in (17.9 in viewable, 0.25-0.25AG) Monitor.
- B. Provide an uninterruptible power supply system providing battery backup for each operator workstation and peripheral devices. UPS shall protect against blackouts, brownouts, surges and noise. UPS shall include LAN port and modem line surge protection. UPS shall be sized for a 7-minute full load runtime, 23-minute ½ load runtime with a typical runtime of up to 60 minutes. Transfer time shall be 2-4 milliseconds. UPS shall provide a 480-joule suppression rating, and current suppression protection for 36,000 amps and provide 90% recharge capability in 2-4 hours. Suppression response time shall be instantaneous. UPS low voltage switching shall occur when supply voltage is less than 94 volts. UPS shall be provided with modem surge suppression and LAN port connections. Provide all software, cables, peripherals etc. for a complete system.
- C. Provide detachable keyboard with standard typewriter layout, function keys, and separate numeric keypad. Provide a USB mouse and mouse pad with the system. Provide one open serial port after configuration of the workstation to meet the requirements of the rest of these specifications.

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- D. Workstation PC shall have the capability of changing serial port interrupt vectors and IOBASE addresses through software.
- E. Operating system for operator workstation shall be Microsoft Windows 2000 Professional.

 Provide Microsoft Office 2000 Professional or Office XP Professional Software. All software shall be at least the latest version available as of the date of contract completion.
 - F. Provide network configuration tool, all programming applications, graphic creation tools and all other software required to configure and operate the system.
 - G. For CSSs that provide web services for presentation of data across the Internet, all Web components and services shall be installed with required licensing. CSS shall be configured to secure it to the extent practical inside the Local Supervisory LAN. CSS shall always function from behind a firewall provided either by the government network administrators in the case where they provide the LAN infrastructure, or by this contractor where the LAN is provided under this Division of the specifications.
 - H. Provide network card approved by BAS manufacturer to support Supervisory LAN communications (100 Mbps Ethernet TCP/IP)
- I. Provide 'PC Anywhere' software by Symantec Corporation and configure it to operate across the LAN and WAN.
- J. Provide additional hardware, video drivers, etc., to facilitate all control functions and software requirements specified for the BAS.
- 20 K. Control System Server shall be located as directed by the DC Government.

21 2.03 PORTABLE OPERATORS TERMINAL (POT) / REMOTE WORKSTATION

- A. Portable Operators Terminal shall support system management by connection to the controllers, by connection via the Internet, and by dial-up communications while serving as the remote workstation.
 - B. Provide one notebook personal computer (PC) with Intel Pentium III with minimum 800MHz processor. Include 512 MB RAM and minimum 40GB/7200 RPM hard disk drive, 20x/10x/40x CD-RW Drive. Provide 3.5 inch high density floppy disk drive, an internal 56k modem, serial and parallel ports, Type II and Type III PCMCIA slots, touch pad, rechargeable battery, and 110V power supply/charger.
 - C. Provide a 10/100 LAN+56K CardBus Type III PC Card
- D. Provide minimum 14.1" XGA active matrix display.
- 32 E. Provide carrying case and extra battery.
- F. Operating system for operator workstation shall be Microsoft Windows 2000 Professional. Provide Microsoft Office 2000 Professional or Office XP Professional Software.
- G. Provide software, graphics and programming as specified in Section 15955.
- H. Provide additional hardware, video drivers, etc., to facilitate all control functions and software requirements specified for the building automation system.
- I. Provide all controller configuration and interface software and/or plug ins for all devices applicable. All shall be loaded and functional. Provide all required interface cables required to connect to all networks, routers, controllers, SDs etc.
- 41 J. Wherever a POT connection point is not provided accessible in the same room as the device controlled, contractor shall provide a wireless system to permit configuration, testing and operation from within the room. Wireless system shall have the range to reliably communicate with the most remote room

1 2.04 <u>PRINTER</u>

- A. Provide 600x600 dpi, min 4 sheets per minute laser printer with 8-1/2" x 11" and 11" x 17" paper trays.
- 4 B. Automatic Switch
- 5 C. Provide Dot Matrix continuous tractor-feed alarm printer.
- 6 D. Provide these printers at each specified CSS and Operator Workstation (excluding POTs)

7 PART III. PART 3 - EXECUTION

8 3.01 INSTALLATION

- 9 A. Set up the workstations and printers as indicated on the drawings. Install all software and verify that the systems are fully operational. Ensure licensing is provided for all software.
- B. No license, software component, key, etc or any piece of information required to install, configure, operate, diagnose and maintain the system shall be withheld from the DC Government.
- 14 C. Install electronic control system Operation and Maintenance Manuals, programming guides, network configuration tools, control shop drawings etc on each OWS and CSS. Provide interface or shortcuts to guide user to the appropriate information.
- D. Set up portable operator terminal and configure it as the remote workstation. Install all software and verify that the system is fully operational.
 - E. Install systems and materials in accordance with manufacturer's instructions.

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END OF SECTION 15952

1 2	SECTION 15953 - BAS FIELD PANELS						
3	PART 1	[.	PART 1 - GENERAL				
4	1.01	SECT	ION INCLUDES:				
5		A.	Building Controller (BC)				
6		B.	Advance Application Specific Controller (AAC)				
7		C.	Application Specific Controller (ASC)				
8	1.02	RELA	TED DOCUMENTS:				
9 10		A.	Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.				
11		B.	Section 15050 -Basic Mechanical Materials and Methods				
12 13		C.	Section 15949 - Building Automation System (BAS) General – Refer to this section for definitions of terminology				
14		D.	Section 15951 - BAS Basic Materials, Interface Devices, and Sensors				
15		E.	Section 15952 - BAS Operator Interfaces				
16		F.	Section 15954 - BAS Communications Devices				
17		G.	Section 15955 - BAS Software				
18		H.	Section 15958 - Sequences of Operation				
19		I.	Section 15959 – BAS Commissioning				
20	1.03	DESC	RIPTION OF WORK:				
21 22		A.	Furnish and install DDC Control units and/or Smart Devices required to support specified building automation system functions.				
23		B.	Refer to Section 15949 for general requirements.				
24	PART 1	II.	PART 2 - PRODUCTS				
25	2.01	STAN	D-ALONE FLINCTION ALITY				

- General: These requirements clarify the requirement for stand-alone functionality relative to A. packaging I/O devices with a controller. Stand-alone functionality is specified with the controller and for each Application Category specified in Part 3. This item refers to acceptable paradigms for associating the points with the processor.
- B. 30 Functional Boundary: Provide controllers so that all points associated with and common to one 31 unit or other complete system/equipment shall reside within a single control unit. The boundaries 32 of a standalone system shall be as dictated in the contract documents. Generally systems 33 specified for the Application Category will dictate the boundary of the standalone control 34 functionality. See related restrictions below. When referring to the controller as pertains to the 35 standalone functionality, reference is specifically made to the processor. One processor shall 36 execute all the related I/O control logic via one operating system that uses a common 37 programming and configuration tool.

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2		C.		following configurations are considered acceptable with reference to a controller's indalone functionality:
3 4			1.	Points packaged as integral to the controller such that the point configuration is listed as an essential piece of information for ordering the controller (having a unique ordering number).
5 6			2.	Controllers with processors and modular back planes that allow plug in point modules as ar integral part of the controller.
7 8			3.	I/O point expander boards, plugged directly into the main controller board to expand the point capacity of the controller.
9 10 11 12 13			4.	I/O point expansion devices connected to the main controller board via wiring and as such may be remote from the controller and that communicate via a sub LAN protocol. These arrangements to be considered standalone shall have a sub LAN that is dedicated to that controller and include no other controller devices (AACs or ASCs). All wiring to interconnect the I/O expander board shall be:
14				a) Contained in the control panel enclosure;
15				b) Or run in conduit. Wiring shall only be accessible at the terminations.
16 17		D.	The stan	following configurations are considered unacceptable with reference to a controller's adalone functionality:
18			1.	Multiple controllers enclosed in the same control panel to accomplish the point requirement.
19	2.02	<u>BUILDI</u>	NG C	ONTROLLER (BC)
20		A.	Gen	neral Requirements:
21 22 23 24			1.	The BC(s) shall provide fully distributed control independent of the operational status of the OWSs and CSS. All necessary calculations required to achieve control shall be executed within the BC independent of any other device. All control strategies performed by the BC(s) shall be both operator definable and modifiable through the Operator Interfaces.
25 26 27 28 29 30 31 32 33 34 35 36			2.	BCs shall perform overall system coordination, accept control programs, perform automated HVAC functions, control peripheral devices and perform all necessary mathematical and logical functions. BCs shall share information with the entire network of BCs and AACs/ASCs for full global control. Each controller shall permit multi-use operation from multiple workstations and portable operator terminals connected either locally or over the Primary Controller LAN. Each unit shall have its own internal RAM, non-volatile memory, microprocessor, battery backup, regulated power supply, power conditioning equipment, ports for connection of operating interface devices, and control enclosure. BCs shall be programmable from an operator workstation, portable operators terminal, or hand held operating device. BC shall contain sufficient memory for all specified global control strategies, user defined reports and trending, communication programs, and central alarming.
37			3.	BCs shall be connected to a controller network that qualifies as a Primary Controlling LAN.
38 39			4.	All BCs shall be protected from any memory loss due to a loss of power by one or a combination of the following:
40 41 42				a) Volatile RAM shall have a battery backup using a lithium battery with a rated service life of fifty (50) hours, and a rated shelf life of at least five years. Self-diagnostic routine shall report an alarm for a low battery condition.
43				b) EEPROM, EPROM, or NOVROM non-volatile memory
44 45 46 47 48			5.	In addition BCs may provide intelligent, standalone control of HVAC functions. Each BC may be capable of standalone direct digital operation utilizing its own processor, non volatile memory, input/output, wiring terminal strips, A/D converters, real-time clock/calendar and voltage transient and lightning protection devices. Refer to standalone functionality specified above.
49 50 51			6.	The BC may provide for point mix flexibility and expandability. This requirement may be met via either a family of expander boards, modular input/output configuration, or a combination thereof. Refer to stand alone functionality specified above.

- All BC point data, algorithms and application software shall be modifiable from the Operator Workstation.
- 8. Each BC shall execute application programs, calculations, and commands via a microprocessor resident in the BC. The database and all application programs for each BC shall be stored in non-volatile or battery backed volatile memory within the BC and will be able to upload/download to/from the OWS and/or CSS.
- 9. BC shall provide buffer for holding alarms, messages, trends etc.
- Each BC shall include self-test diagnostics, which allow the BC to automatically alarm any
 malfunctions, or alarm conditions that exceed desired parameters as determined by
 programming input.
- 11. Each BC shall contain software to perform full DDC/PID control loops.
- 12. For systems requiring end-of-line resistors those resistors shall be located in the BC.
- 13. Input-Output Processing
 - a) <u>Digital Outputs (DO)</u>: Outputs shall be rated for a minimum 24 Vac or Vdc, 1 amp maximum current. Each shall be configurable as normally open or normally closed. Each output shall have an LED to indicate the operating mode of the output and a manual hand off or auto switch to allow for override. If these HOA switches are not provided on the main board they shall be provided via isolation relays within the control enclosure. Each DO shall be discrete outputs from the BC's board (multiplexing to a separate manufacturer's board is unacceptable). Provide suppression to limit transients to acceptable levels.
 - b) Analog Inputs (AI): AI shall be O-5 Vdc, 0-10 Vdc, 0-20 Vdc, and 0-20 mA. Provide signal conditioning, and zero and span calibration for each input. Each input shall be a discrete input to the BC's board (multiplexing to a separate manufacturers board is unacceptable unless specifically indicated otherwise). A/D converters shall have a minimum resolution of 12 bits.
 - c) <u>Digital Inputs (DI):</u> Monitor dry contact closures. Accept pulsed inputs of at least one per second. Source voltage for sensing shall be supplied by the BC and shall be isolated from the main board. Software multiplexing of an AI and resistors may only be done in non-critical applications and only with prior approval of Architect/Engineer.
 - d) Universal Inputs (UI-Al or DI): To serve as either Al or DI as specified above.
 - e) <u>Electronic Analog Outputs (AO)</u>: Voltage mode: 0-5 Vdc and 0-10 Vdc; Current mode: 4-20 mA. Provide zero and span calibration and circuit protection. Pulse Width Modulated (PWM) analog via a DO and transducer is acceptable only with DC Government approval (Generally these will not be allowed on loops with a short time constant such as discharge temperature loops, economizer loops, pressure control loops and the like. They are generally acceptable for standard room temperature control loops.). Where these are allowed, transducer/actuator shall be programmable for normally open, normally closed, or hold last position and shall allow adjustable timing. Each DO shall be discrete outputs from the BC's board (multiplexing to a separate manufacturers board is unacceptable). D/A converters shall have a minimum resolution of 10 bits.
 - f) Pulsed Inputs: Capable of counting up to 8 pulses per second with buffer to accumulate pulse count. Pulses shall be counted at all times.
- 14. A communication port for operator interface through a terminal shall be provided in each BC. It shall be possible to perform all program and database back-up, system monitoring, control functions, and BC diagnostics through this port. Standalone BC panels shall allow temporary use of portable devices without interrupting the normal operation of permanently connected modems, printers, or workstations.
- 15. Each BC shall be equipped with loop tuning algorithm for precise proportional, integral, derivative (PID) control. Loop tuning tools provided with the Operator Workstation software is acceptable. In any case, tools to support loop tuning must be provided such that P, I, and D gains are automatically calculated.
- 16. All analog output points shall have a selectable failure setpoint. The BC shall be capable of maintaining this failure setpoint in the event of a system malfunction, which causes loss of

1 2			BC control, or loss of output signal, as long as power is available at the BC. The failure setpoint shall be selectable on a per point basis.
3		17.	Slope intercepts and gain adjustments shall be available on a per-point basis.
4		18.	BC Power Loss:
5 6			a) Upon a loss of power to any BC, the other units on the primary controlling network shall not in any way be affected.
7 8 9 10 11			b) Upon a loss of power to any BC, the battery backup shall ensure that the energy management control software, the Direct Digital Control software, the database parameters, and all other programs and data stored in the RAM are retained for a minimum of fifty (50) hours. An alarm diagnostic message shall indicate that the BC is under battery power.
12 13 14 15			c) Upon restoration of power within the specified battery backup period, the BC shall resume full operation without operator intervention. The BC shall automatically reset its clock such that proper operation of any time dependent function is possible without manual reset of the clock. All monitored functions shall be updated.
16 17 18 19 20 21 22 23 24			d) Should the duration of a loss of power exceed the specified battery back-up period or BC panel memory be lost for any reason, the panel shall automatically report the condition (upon resumption of power) and be capable of receiving a download via the network, and connected computer. In addition, the DC Government shall be able to upload the most current versions of all energy management control programs, Direct Digital Control programs, database parameters, and all other data and programs in the memory of each BC to the operator workstation via the local area network, or via the telephone line dial-up modem where applicable, or to the laptop PC via the local RS-232C port.
25		19.	BC Failure:
26 27 28 29 30			a) Building Controller LAN Data Transmission Failure: BC shall continue to operate in stand-alone mode. BC shall store loss of communication alarm along with the time of the event. All control functions shall continue with the global values programmable to either last value or a specified value. Peer BCs shall recognize the loss, report alarm and reconfigure the LAN.
31 32			b) BC Hardware Failure: BC shall cease operation and terminate communication with other devices. All outputs shall go to their specified fail position.
33 34 35		20.	Each BC shall be equipped with firmware resident self-diagnostics for sensors and be capable of assessing an open or shorted sensor circuit and taking an appropriate control action (close valve, damper, etc.).
36 37 38		21.	BCs may include LAN communications interface functions for controlling secondary controlling LANs Refer to Section 15954 - BAS System Communications Devices for requirements if this function is packaged with the BC.
39		22.	A minimum of four levels of password protection shall be provided at each BC.
40 41		23.	BCs shall be mounted on equipment, in packaged equipment enclosures, or locking wall mounted in a NEMA 1 enclosure, as specified elsewhere.
42	B.	BAC	net Building Controller Requirements:
43 44		1.	The BC(s) shall support all BIBBs defined in the BACnet Building Controller (B-BC) device profile as defined in the BACnet standard.
45		2.	BCs shall communicate over the BACnet Building Controller LAN.
46 47 48		3.	Each BC shall be connected to the BACnet Building Controller LAN communicating to/from other BCs.

2.03 ADVANCED APPLICATION SPECIFIC CONTROLLER (AAC) AND APPLICATION SPECIFIC CONTROLLER (ASC)

A. General Requirements:

- AACs and ASCs shall provide intelligent, standalone control of HVAC equipment. Each
 unit shall have its own internal RAM, non-volatile memory and will continue to operate all
 local control functions in the event of a loss of communications on the ASC LAN or subLAN. Refer to standalone requirements by application specified in Part 3 of this section. In
 addition, it shall be able to share information with every other BC and AAC /ASC on the
 entire network.
- Each AAC and ASC shall include self-test diagnostics that allow the AAC /ASC to automatically relay to the BC, LAN Interface Device or workstation, any malfunctions or abnormal conditions within the AAC /ASC or alarm conditions of inputs that exceed desired parameters as determined by programming input.
- 3. AACs and ASCs shall include sufficient memory to perform the specific control functions required for its application and to communicate with other devices.
- 4. Each AAC and ASC must be capable of stand-alone direct digital operation utilizing its own processor, non-volatile memory, input/output, minimum 8 bit A to D conversion, voltage transient and lightning protection devices. All volatile memory shall have a battery backup of at least fifty- (50) hrs with a battery life of five years.
- 5. All point data; algorithms and application software within an AAC /ASC shall be modifiable from the Operator Workstation.
- 6. AAC and ASC Input-Output Processing
 - a) <u>Digital Outputs (DO)</u>: Outputs shall be rated for a minimum 24 VAC or VDC, 1 amp maximum current. Each shall be configurable as normally open or normally closed. Each output shall have an LED to indicate the operating mode of the output and a manual hand off or auto switch to allow for override. If these HOA switches are not provided on the main board they shall be provided via isolation relays within the control enclosure. Each DO shall be discrete outputs from the AAC/ASC's board (multiplexing to a separate manufacturer's board is unacceptable). Provide suppression to limit transients to acceptable levels.
 - b) Analog Inputs (AI): AI shall be O-5 Vdc, 0-10Vdc, 0-20Vdc, and 0-20 mA. Provide signal conditioning, and zero and span calibration for each input. Each input shall be a discrete input to the BC's board (multiplexing to a separate manufacturers board is unacceptable unless specifically indicated otherwise). A/D converters shall have a minimum resolution of 8-10 bits depending on application.
 - c) <u>Digital Inputs (DI)</u>: Monitor dry contact closures. Accept pulsed inputs of at least one per second. Source voltage for sensing shall be supplied by the BC and shall be isolated from the main board. Software multiplexing of an AI and resistors may only be done in non-critical applications and only with prior approval of Architect/Engineer
 - d) <u>Universal Inputs (UI-AI or DI)</u>: To serve as either AI or DI as specified above.
 - e) <u>Electronic Analog Outputs (AO) as required by application</u>: voltage mode, 0-5VDC and 0-10VDC; current mode (4-20 mA). Provide zero and span calibration and circuit protection. Pulse Width Modulated (PWM) analog via a DO and transducer is acceptable only with DC Government approval (Generally, PWM will not be allowed on loops with a short time constant such as discharge temperature loops, economizer loops, pressure control loops and the like. They are generally acceptable for standard room temperature control loops.). Where PWM is allowed, transducer/actuator shall be programmable for normally open, normally closed, or hold last position and shall allow adjustable timing. Each DO shall be discrete outputs from the BC's board (multiplexing to a separate manufacturers board is unacceptable). D/A converters shall have a minimum resolution of 8 bits.

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- B. BACnet AAC(s) and ASC(s) Requirements:
- The AAC(s) and ASC(s) shall support all BIBBs defined in the BACnet Building Controller (B-AAC and B-ASC) device profile as defined in the BACnet standard.
 - AAC(s) and ASC(s) shall communicate over the BACnet Building Controller LAN or the ASC LAN or sub-LAN.
 - Each BC shall be connected to the BACnet Building Controller LAN communicating to/from other BCs.

C. Terminal Box Controllers:

1. Terminal box controllers controlling damper positions to maintain a quantity of supply or exhaust air serving a space shall have an automatically initiated function that resets the volume regulator damper to the fully closed position on a scheduled basis. The controllers shall initially be set up to perform this function once every 24 hours. The purpose of this required function is to reset and synchronize the actual damper position with the calculated damper position and to assure the damper will completely close when commanded. The software shall select scheduled boxes randomly and shall not allow more than 5% of the total quantity of controllers in a building to perform this function at the same time. When possible the controllers shall perform this function when the supply or exhaust air system is not operating or is unoccupied.

20 PART III. PART 3 - EXECUTION

21 3.01 INSPECTION:

A. Examine areas and conditions under which control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

24 3.02 INSTALLATION OF CONTROL SYSTEMS:

A. General: Install systems and materials in accordance with manufacturer's instructions, specifications roughing-in drawings and details shown on drawings. Contractor shall install all controllers in accordance with manufacturer's installation procedures and practices.

28 3.03 HARDWARE APPLICATION REQUIREMENTS

- A. General: The functional intent of this specification is to allow cost effective application of manufacturers standard products while maintain the integrity and reliability of the control functions. A Building Controller as specified above is generally fully featured and customizable whereas the AAC/ASC refers to a more cost-effective unit designed for lower-end applications. Specific requirements indicated below are required for the respective application. Manufacturer may apply the most cost-effective unit that meets the requirement of that application.
- B. Standalone Capability: Each Control Unit shall be capable of performing the required sequence of operation for the associated equipment. All physical point data and calculated values required to accomplish the sequence of operation shall originate within the associated CU with only the exceptions enumerated below. Refer to Item 2.01 above for physical limitations of standalone functionality. Listed below are functional point data and calculated values that shall be allowed to be obtained from or stored by other CUs or SDs via LAN.
- 41 C. Where associated control functions involve functions from different categories identified below, the requirements for the most restrictive category shall be met.
 - D. Application Category 0 (Distributed monitoring)
 - 1. Applications in this category include the following:
 - a) Monitoring of variables that are not used in a control loop, sequence logic, or safety.

1 2		2.		ats on BCs, AACs, and ASCs may be used in these applications as well as SDs and/or eral-purpose I/O modules.			
3 4 5		3.	band	ere these points are trended, contractor shall verify and document that the network dwidth is acceptable for such trends and is still capable of acceptable and timely control tion.			
6	E.	App	pplication Category 1 (Application Specific Controller):				
7		1.		lications in this category include the following:			
8		•••	a)	Water Source heat Pumps			
9			b)	Airflow Control Boxes (VAV and Constant Volume Terminal Units)			
			,				
10			c)	Misc. Heaters			
11			d)	Unitary equipment <15 tons (Package Terminal AC Units, Split-System AC Units)			
12		2.		S may be used in these applications.			
13 14 15 16 17 18 19		3.	a gi follo of a that obta defa	indalone Capability: Provide capability to execute control functions for the application for ven setpoint or mode, which shall generally be occupied mode control. Only the wing data (as applicable) may be acquired from other controllers via LANs. In the event loss of communications with any other controller, or any fault in any system hardware interrupts the acquisition of any of these values, the ASC shall use the last value lined before the fault occurred. If such fault has not been corrected after the specified full delay time, specified default value(s) shall then be substituted until such fault has no corrected.			
21 22 23 24 25 26			200.	Physical/Virtual Point Scheduling Period Normal Norming Warm-Up Off (cold discharge air) Load Shed Off (no shedding) Summer/Winter Trend Data N/A			
27		4.	Mou	inting:			
28 29			a)	ASCs that control equipment located above accessible ceilings shall be mounted on the equipment in an accessible enclosure and shall be rated for plenum use.			
30 31 32			b)	ASCs that control equipment mounted in a mechanical room may either be mounted in, on the equipment, or on the wall of the mechanical room at an adjacent, accessible location.			
33 34			c)	ASCs that control equipment mounted outside or in occupied spaces shall either be located in the unit or in a proximate mechanical/utility space.			
35 36			d)	Section 15953 contractor may furnish ASCs to the terminal unit manufacturer for factory mounting.			
37 38 39 40 41		5.	Programmability: Operator shall be able to modify all setpoints (temperature and airflow scheduling parameters associated with the unit, tuning and set up parameters, interstage timing parameters, and mode settings. Application-specific block control algorithms may used to meet the sequence of operations. The ability to customize the control algorithm not required unless specifically indicated otherwise.				
42 43		6.		Restrictions: Limit the number of nodes on the network to the maximum mmended by the manufacturer.			
14	F.	App	licatio	n Category 2 (General Purpose Terminal Controller)			
45		1.	App	lications in this category include the following:			
46 47			a)	Unitary Equipment >= 15 tons (Air Conditioners, Packaged Heating/Cooling Units, and the like)			
48			b)	Small, Constant Volume Single Zone Air Handling Units			
49			c)	Constant Volume Pump Start/Stop			
50			d)	Misc. Equipment (Exhaust Fan) Start/Stop			
			,				

1 2			e) Misc. Monitoring (not directly associated with a control sequence and where trending is not critical)
3		2.	BCs may be used in these applications.
4 5 6		3.	ASC's may be used in these applications provided the ASC meets all requirements specified below. This category requires a general-purpose ASC to which application-specific control algorithms can be attached.
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21		4.	Standalone Capability: Only the following data (as applicable) may be acquired from other ASCs via LANs. In the event of a loss of communications with any other ASCs, or any fault in any system hardware that interrupts the acquisition of any of these values, the AAC/ASC shall use the last value obtained before the fault occurred. If such fault has not been corrected after the specified default delay time, specified default value(s) shall then be substituted until such fault has been corrected. Physical/Virtual Point Default Delay Time Default Value Outside Air Temperature 3 minutes 80°F Outside Air Humidity 3 minutes 60%RH Outside Air Enthalpy 3 minutes 30 Btu/lb Trend Data N/A Cooling/Heating Requests 3 minutes None Mounting: a) ASCs that control equipment located above accessible ceilings shall be mounted on the equipment and shall be rated for plenum use.
22 23 24 25			b) ASCs that control equipment located in occupied spaces or outside shall either be mounted within the equipment enclosure (responsibility for physical fit remains with the contractor) or in a near by mechanical/utility room in which case it shall be enclosed in a NEMA 1, locking enclosure.
26 27 28 29 30 31 32		5.	Programmability: Operator shall be able to modify all setpoints (temperature and airflow), scheduling parameters associated with the unit, tuning and set up parameters, interstage timing parameters, and mode settings. Operator shall be able to address and configure spare inputs for monitoring. Operator shall be able to address and configure spare outputs for simple single loop control actions or event initiated actions. Application-specific block control algorithms shall used to meet the sequence of operations. The ability to customize the control algorithm is not required unless specifically indicated otherwise.
33 34		6.	LAN Restrictions: Limit the number of nodes servicing any one of these applications on the AAC/ASC LAN to 32.
35	G.	App	cation Category 3 (Advanced Application Controller)
36		1.	Applications in this category include the following:
37			a) Large Constant Volume Air Handlers
38			b) VAV Air Handlers {generally >5,000 and <10,000cfm}
39			c) Self Contained VAV Units
40		2.	BCs may be used in these applications.
41		3.	AAC's may be used in these applications provided:
42			a) The AAC's meets all requirements specified below.
43			b) All control functions and physical I/O associated with a given unit resides in one AAC.
44 45 46			c) Input A/D is 10-bit. <i>Exception</i> : 8-bit input A/D can be used when matched with high accuracy sensors, the range of which meets the resolution requirements specified for the applicable sensor in Section 15951.
47 48			d) Pulsed inputs required for the application can be monitored and accumulated effectively.
49 50 51 52		4.	Standalone Capability: Only the following data (as applicable) may be acquired from other AACs via LANs. In the event of a loss of communications with any other AACs, or any fault in any system hardware that interrupts the acquisition of any of these values, the AAC shall use the last value obtained before the fault occurred. If such fault has not been corrected

1							value(s) shall then be substituted
2 3					I such fault has been corrected. physical/virtual point	default delay time	edefault value
4					Outside Air Temperature	3 minutes	80°F
5					Outside Air Humidity	3 minutes	60%RH
6					Outside Air Enthalpy	3 minutes	30 Btu/lb
7					Enable Local Operation		Last Value
8 9					Cooling/Heating Requests Mounting:	3 minutes	None
10 11				a)	AACs that control equipment the equipment and shall be rat		sible ceilings shall be mounted on
12 13 14 15				b)	mounted within the equipmen	t enclosure (respons by mechanical/utility	spaces or outside shall either be sibility for physical fit remains with y room in which case it shall be
16 17 18 19 20 21 22 23			5.	schetimi spa algo of a prov	eduling parameters associated ng parameters, and mode setti re inputs for monitoring. Oper orithms and specify trending para loss of communications. App	with the unit, tuning ngs. Operator shall rator shall be able rameters, which will back blication-specific bloc	etpoints (temperature and airflow), and set up parameters, interstage be able to address and configure to program custom DDC control be retained in memory in the event k control algorithms may be used introl algorithms shall be completely
24 25			6.	LAN	Restrictions: Each LAN which local operator workstation shall	participates in the tra	ansfer of data between the CU and
26 27				a)			nese applications on the AAC/ASC
28 29				b)	The building controller LAN slimitations.	shall be subject only	to manufacturers published LAN
30		H.	Арр	Application Category 4			
31			1.	App	lications in this category include	the following:	
32				a)	Central Cooling Plant	· ·	
33				b)	Central Heating Plant		
34				c)	Cooling Towers		
35				d)	Sequenced or Variable Speed	Pump Control	
36				e)	Air Handlers over 10,000 cfm	or serving critical area	as
37 38			2.	BCs	s shall be used in these applicat	ions.	
39	3.04	CONT	ROL UNIT REQUIREMENTS				
40 41		A.	Ref	er to S	Section 15949 for requirements	pertaining to control u	unit quantity and location.
42	END O	F SECTI	ON 1	5953			
43							

1	SECTION 15954 - BAS COMMUNICATION DEVICES
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3 PART I. PART 1 - GENERAL

4 1.01 <u>SECTION INCLUDES</u>

- 5 A. Network Integration Devices
- 6 1.02 RELATED DOCUMENTS:
- 7 A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- 9 B. Section 15050 -Basic Mechanical Materials and Methods
- 10 C. Section 15949 Building Automation System (BAS) General
- 11 D. Section 15951 BAS Basic Materials, Interface Devices, and Sensors
- 12 E. Section 15952 BAS Operator Interfaces
- F. Section 15953 BAS Field Panels
- 14 G. Section 15955 BAS Software
- 15 H. Section 15958 Sequences of Operation
- I. Section 15959 BAS Commissioning

17 1.03 DESCRIPTION OF WORK

A. Contractor shall provide all interface devices and software to provide an integrated system connecting BCs, AACs, ASCs.

20 PART II. PART 2 - PRODUCTS

21 2.01 CONTROLLER LOCAL AREA NETWORK INTERFACE DEVICES (LANID)

- A. The Controller LANID shall be a microprocessor-based communications device which acts as a gateway/router between the Primary LAN, Secondary LAN, an operator interface, modem to support remote operator interface, or printer. These may be provided within a BC or as a separate device.
- B. The LANID shall perform information translation between the Primary LAN and the Secondary LAN, supervise communications on a polling secondary LAN, and shall be applicable to systems in which the same functionality is not provided in the BC. In systems where the LANID is a separate device, it shall contain its own microprocessor, RAM, battery, real-time clock, communication ports, and power supply as specified for a BC in Section 15953. Each LANID shall be mounted in a lockable enclosure.
- 32 C. Each LANID shall support interrogation, full control, and all utilities associated with all BCs on the Primary LAN, all AACs and ASCs connected to all secondary LANs under the Primary Controller LAN, and all points connected to those PCUs and SCUs.
- D. Upon loss of power to a LANID, the battery shall provide for minimum 100-hour backup of all programs and data in RAM. The battery shall be sealed and self-charging.
- 37 E. The LANID shall be transparent to control functions and shall not be required to control information routing on the Primary LAN

F. All BACnet Interoperability Building Blocks (BIBBs) are required to be supported for each native BACnet device or Gateway. The Gateway shall support all BIBBs defined in the BACnet Gateway's device profile as defined in the BACnet standard.

4 2.02 <u>LOCAL SUPERVISORY LAN GATEWAYS/ROUTERS</u>

- 5 A. The Supervisory Gateway shall be a microprocessor-based communications device that acts as a gateway/router between the Supervisory LAN CSSs or OWS and the Primary LAN.
- 7 B. The Gateway shall perform information translation between the Primary LAN and the Local Supervisory LAN, which is 100 Mbps Ethernet TCP/IP and shall preferably use BACnet over IP. When BACnet is used, refer to the requirements of the BACnet Gateways specified herein.
- The gateway shall contain its own microprocessor, RAM, battery, real-time clock, communication ports, and power supply as specified for a BC in Section 15953. Each gateway/router shall be mounted in a lockable enclosure unless it is a PC that also serves as an OWS.
 - D. The gateway/router shall allow centralized overall system supervision, operator interface, management report generation, alarm annunciation, acquisition of trend data, and communication with control units. It shall allow system operators to perform the following functions from the CSS, OWSs, and POTs:
 - Configure systems.
 - 2. Monitor and supervise control of all points.
 - Change control setpoints.
 - 4. Override input values.
 - 5. Override output values
 - 6. Enter programmed start/stop time schedules.
 - 7. View and acknowledge alarms and messages.
 - 8. Receive, store and display trend logs and management reports.
 - 9. Upload/Download programs, databases, etc. as specified.
- E. Upon loss of power to the Gateway, the battery shall provide for minimum 100 hour backup of all programs and data in RAM. The battery shall be sealed and self-charging.
- F. The Gateway shall be transparent to control functions and shall not be required to control information routing on the Primary LAN

30 PART III. PART 3 - EXECUTION

31 3.01 INSPECTION:

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A. Examine areas and conditions under which control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

34 3.02 INSTALLATION OF CONTROL SYSTEMS:

- A. General: Install systems and materials in accordance with manufacturer's instructions, roughingin drawings and details shown on drawings.
- 37 B. Contractor shall provide all interface devices and software to provide an integrated system.
- 38 C. Contractor shall closely coordinate with the DC Government, or designated representative, to establish IP addresses and communications to assure proper operation of the building control system.

42 END OF SECTION 15954

1 2	SECTI	ON 159	55 - BAS SOFTWARE AND PROGRAMMING				
3	PART I.		PART 1 - GENERAL				
4	1.01	SECT	TION INCLUDES				
5		A.	System Software				
6		B.	Programming Description				
7		C.	Control Algorithms				
8		D.	Energy Management Applications				
9		E.	Password Protection				
10		F.	Alarm Reporting				
11		G.	Trending				
12		H.	Data Acquisition and Storage				
13		I.	Point Structuring				
14		J.	Dynamic Color Graphics				
15	1.02	RELA	TED DOCUMENTS:				
16 17		A.	Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.				
18		B.	Section 15050 -Basic Mechanical Materials and Methods				
19		C.	Section 15949 - Building Automation System (BAS) General				
20		D.	Section 15951 - BAS Basic Materials, Interface Devices, and Sensors				
21		E.	Section 15952 - BAS Operator Interfaces				
22		F.	Section 15953 - BAS Field Panels				
23		G.	Section 15954 - BAS Communications Devices				
24		H.	Section 15958 - Sequences of Operation				
25		I.	Section 15959 – BAS Commissioning				
26	1.03	DESC	CRIPTION OF WORK:				
27 28		A.	Fully configure systems and furnish and install all software, programming and dynamic color graphics for a complete and fully functioning system as specified.				
29		B.	Refer to Section 15949 - Building Automation System (BAS) for general requirements				
30 31		C.	Refer to 15958 - Sequence of Operation for specific sequences of operation for controlled equipment.				
32	1.04	LICE	<u>NSING</u>				
33		A.	Include licensing for all software packages at all required workstations or CSS's.				

- B. All operator interface, programming environment, networking, database management and any other software used by the Contractor to install the system or needed to operate the system to its full capabilities shall be licensed and provided to the DC Government.
 - C. All software should be available on all Operator Workstations or CSSs provided, and on all Portable Operator Terminals. Hardware and software keys to provide all rights shall be installed on all workstations. At least 2 sets of CDs shall be provided with backup software for all software provided, so that the DC Government may reinstall any software as necessary. Include all licensing for workstation operating systems, and all required third-party software licenses.
- 9 D. Provide licensing and original software copies for each OWS or CSS. Licenses for remote graphic workstations shall allow for access to any site and shall not be restricted to accessing only the LANs included in this project.
- 12 E. Provide 2 additional licenses for simultaneous access by a remote web browser.
- F. Upgrade all software packages to the release (version) in effect at the end of the Warranty Period.
- 15 G. Refer to Section 15949 Building Automation System (BAS) General for further requirements.

16 PART II. PART 2 - PRODUCTS

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17 2.01 SYSTEM SOFTWARE-GENERAL

- A. Functionality and Completeness: The Contractor shall furnish and install all software and programming necessary to provide a complete and functioning system as specified. The Contractor shall include all software and programming not specifically itemized in these Specifications, which is necessary to implement, maintain, operate, and diagnose the system in compliance with these Specifications.
- B. Configuration: The software shall support the system as a distributed processing network configuration.

25 2.02 CONTROLLER SOFTWARE

- A. BC Software Residency: Each BC as defined below shall be capable of control and monitoring of all points physically connected to it. All software including the following shall reside and execute at the BC:
 - 1. Real-Time Operating System software
 - 2. Real-Time Clock/Calendar and network time synchronization
 - BC diagnostic software
 - 4. LAN Communication software/firmware
 - Direct Digital Control software
 - 6. Alarm Processing and Buffering software
 - Energy Management software
 - 8. Data Trending, Reporting, and Bufferingsoftware
 - 9. I/O (physical and virtual) database
 - 10. Remote Communication software
- B. AAC/ASC Software Residency: Each AAC/ASC as defined below shall be capable of control and monitoring of all points physically connected to it. As a minimum, software including the following shall reside and execute at the AAC/ASC. Other software to support other required functions of the AAC/ASC may reside at the BC or LAN interface device (specified in Section 15954) with the restrictions/exceptions per application provided in Section 15953:
 - Real-Time Operating System software
- 45 2. AAC/ASC diagnostic software

1 3. LAN Communication software 2 4. Control software applicable to the unit it serves that will support a single mode of operation 3 5. I/O (physical and virtual) database to support one mode of operation 4 C. Stand Alone Capability: BC shall continue to perform all functions independent of a failure in 5 other BC/AAC/ASC or other communication links to other BCs/AACs/ASCs. Trends and runtime 6 totalization shall be retained in memory. Runtime totalization shall be available on all digital input 7 points that monitor electric motor status. Refer also to Section 15953 for other aspects of stand 8 alone functionality. 9 D. Operating System: Controllers shall include a real-time operating system resident in ROM. This software shall execute independently from any other devices in the system. It shall support all 10 11 specified functions. It shall provide a command prioritization scheme to allow functional override 12 of control functions. Refer also to Section 15953 for other aspects of the controllers operating 13 system. 14 E. Network Communications: Each controller shall include software/firmware that supports the networking of CUs on a common communications trunk that forms the respective LAN. Network 15 support shall include the following: 16 17 Building Controller/Primary LAN shall be a high-speed network designed and optimized for control system communication. If a Primary LAN communications trunk is severed, BCs 18 19 shall reconfigure into two separate LANs and continue operations without interruption or 20 Operator intervention. 21 Controller communication software shall include error detection, correction, and re-2. 22 transmission to ensure data integrity. 23 Operator/System communication software shall facilitate communications between other 24 BCs, all subordinate AACs/ASCs, CSS's and LAN Interface Devices or Operator 25 Workstations. Software shall allow point interrogation, adjustment, addition/deletion, and 26 programming while the controller is on line and functioning without disruption to unaffected 27 points. The software architecture shall allow networked controllers to share selected 28 physical and virtual point information throughout the entire system. 29 F. Diagnostic Software: Controller software shall include diagnostic software that checks memory 30 and communications and reports any malfunctions G. 31 Alarm/Messaging Software: Controller software shall support alarm/message processing and 32 buffering software as more fully specified below. 33 H. Application Programs: CUs shall support and execute application programs as more fully 34 specified below: 35 All Direct Digital Control software, Energy Management Control software, and functional 36 block application programming software templates shall be provided in a 'ready-to-use' 37 state, and shall not require (but shall allow) DC Government programming. 38 Line programs shall supply preprogrammed functions to support these energy management 39 and functional block application algorithms. All functions shall be provided with printed narratives and/or flow diagrams to document algorithms and how to modify and use them. 40 I. 41 Security: Controller software shall support multiple level password access restriction as more 42 fully specified below. 43 J. Direct Digital Control: Controller shall support application of Direct Digital Control Logic. All logic 44 modules shall be provided pre-programmed with written documentation to support their 45 application. Provide the following logic modules as a minimum: 46 1. Proportional-Integral-Derivative (PID) control with analog, PWM and floating output 47 2. Two Position control (Hi or Low crossing with deadband) 48 3. Single-Pole Double-Throw relay 49 4. Delay Timer (delay-on-make, delay-on-break, and interval) 50 5. Hi/Low Selection

6.

Reset or Scaling Module

1 7. Logical Operators (And, Or, Not, Xor)

22.

- K. Psychrometric Parameters: Controller software shall provide preprogrammed functions to calculated and present psychrometric parameters (given temperature and relative humidity) including the following as a minimum: Enthalpy, Wet Bulb Temperature.
- L. Updating/Storing Application Data: Site-specific programming residing in volatile memory shall be uploadable/downloadable from an OWS or CSS using BACnet services connected locally, to the Primary LAN, to the Local Supervisory LAN and remotely via the internet and modem and telephone lines as applicable but all must be available. Initiation of an upload or download shall include all of the following methods; Manually, Scheduled, and Automatically upon detection of a loss or change.
- M. Restart: System software shall provide for orderly shutdown upon loss of power and automatic restart upon power restoration. Volatile memory shall be retained; outputs shall go to programmed fail (open, closed, or last) position. Equipment restart shall include a user definable time delay on each piece of equipment to stagger the restart. Loss of power shall be alarmed at operator interface indicating date and time.
- N. Time Synchronization: Operators shall be able to set the time and date in any device on the network that supports time-of-day functionality. The operator shall be able to select to set the time and date for an individual device, devices on a single network, or all devices simultaneously. Automatic time synchronization shall be provided using BACnet services.
- O. Misc. Calculations: System software shall automate calculation of psychometric functions, calendar functions, kWh/kW, and flow determination and totalization from pulsed or analog inputs, curve-fitting, look-up table, input/output scaling, time averaging of inputs and A/D conversion coefficients.

24 2.03 APPLICATION PROGRAMMING DESCRIPTION

- A. The application software shall be user programmable.
- B. This specification generally requires a programming convention that is logical, easy to learn, use, and diagnose. General approaches to application programming shall be provided by one, or a combination, of the following conventions:
 - 1. Point Definition: provide templates customized for point type, to support input of individual point information. Use standard BACnet Objects.
 - 2. Graphical Block Programming: Manipulation of graphic icon 'blocks', each of which represents a subroutine, in a functional/logical manner forming a control logic diagram. Blocks shall allow entry of adjustable settings and parameters via pop-up windows. Provide a utility that shall allow the graphic logic diagrams to be directly compiled into application programs. Logic diagrams shall be viewable either off-line, or on-line with real-time block output values.
 - 3. Functional Application Programming: Pre-programmed application specific programs that allow/require limited customization via 'fill-in-the-blanks' edit fields. Typical values would be setpoints gains, associated point names, alarm limits, etc.
 - Line Programming: Textual syntax-based programming in a language similar to BASIC designed specifically for HVAC control. Subroutines or functions for energy management applications, setpoints, and adjustable parameters shall be customizable, but shall be provided preprogrammed and documented.
- C. Provide a means for testing and/or debugging the control programs both off-line and on-line.

45 2.04 ENERGY MANAGEMENT APPLICATIONS

- A. System shall have the ability to perform all of the following energy management routines via preprogrammed function blocks or template programs. As a minimum provide the following whether or not required in the software:
 - Time-of-Day Scheduling

- 1 2. Calendar-Based Scheduling 2 3. Holiday Scheduling 3 4. Temporary Schedule Overrides 4 5. Optimal Start/Optimal Stop-based on space temperature offset, outdoor air temperature, 5 and building heating and cooling capacitance factors as a minimum Night Setback and Morning Recovery Control, with ventilation only during occupancy 6 6. 7 7. Economizer Control (enthalpy or dry-bulb) 8 Peak Demand Limiting / Load Shedding 8. 9 Dead Band Control 10 В. All programs shall be executed automatically without the need for operator intervention, and shall 11 be flexible enough to allow operator customization. Programs shall be applied to building 12 equipment as described in the Section entitled 'Sequence of Operation'. 13 2.05 PASSWORD PROTECTION 14 A. Multiple-level password access protection shall be provided to allow the DC Government's 15 authorized BAS Administrator to limit workstation control, display and database manipulation 16 capabilities as (s)he deems appropriate for each user, based upon an assigned user name with a 17 unique password. 18 B. All passwords for the system shall be provided to the DC Government including administrator. 19 dealer, or factory level passwords for the systems provided under this project. 20 C. Passwords shall restrict access to all Control Units. D. 21 Each user name shall be assigned to a discrete access level. A minimum of five levels of access 22 shall be supported. Alternately, a comprehensive list of accessibility/functionality items shall be 23 provided, to be enabled or disabled for each user. 24 E. A minimum of 20 user names shall be supported and programmed per DC Government's 25 direction. F. 26 Operators shall be able to perform only those commands available for the access level assigned 27 to their user name. 28 G. User-definable, automatic log-off timers of from 1 to 60 minutes shall be provided to prevent 29 operators from inadvertently leaving interface device software on-line. 30 2.06 ALARM AND EVENT MANAGEMENT REPORTING Alarm management shall be provided to monitor, buffer, and direct alarms and messages to 31 A. 32 operator devices and memory files. Each BC shall perform distributed, independent alarm 33 analysis and filtering to minimize operator interruptions due to non-critical alarms, minimize 34 network traffic, and prevent alarms from being lost. At no time shall a BCs ability to report 35 alarms be affected by either operator activity at an Operator Workstation or local handheld 36 device, or by communications with other panels on the network. 37 Alarm Descriptor: Each alarm or point change shall include that point's English language 38
 - Alarm Descriptor: Each alarm or point change shall include that point's English language description, and the time and date of occurrence. In addition to the alarm's descriptor and the time and date, the user shall be able to print, display and store an alarm message to more fully describe the alarm condition or direct operator response.
 - 2. Alarm Prioritization: The software shall allow users to define the handling and routing of each alarm by their assignment to discrete priority levels. A minimum of ten priority levels shall be provided. For each priority level, users shall have the ability to enable or disable an audible tone whenever an alarm is reported and whenever an alarm returns to normal condition. Users shall have the ability to manually inhibit alarm reporting for each individual alarm and for each priority level. Contractor shall coordinate with the DC Government on establishing alarm priority definitions.

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3. Alarm Report Routing: Each alarm priority level shall be associated with a unique user-defined list of operator devices including any combination of local or remote workstations, printers and workstation disk files. All alarms associated with a given priority level shall be routed to all operator devices on the user-defined list associated with that priority level. For each priority level, alarms shall be automatically routed to a default operator device in the event that alarms are unable to be routed to any operator device assigned to the priority level.

- 4. Auto-Dial Alarm Routing: For alarm priority levels that include a remote workstation (accessed by modem) as one of the listed reporting destinations, the BC shall initiate a call to report the alarm, and shall terminate the call after alarm reporting is complete. System shall be capable of multiple retries and buffer alarms until a connection is made. If no connection is made, system shall attempt connection to an alternate dial-up workstation. System shall also be able to dial multiple pagers upon alarm activation.
- Alarm Acknowledgment: For alarm priority levels that are directed to a workstation screen, an indication of alarm receipt shall be displayed immediately regardless of the application in use at the workstation, and shall remain on the screen until acknowledged by a user having a password that allows alarm acknowledgment. Upon acknowledgment, the complete alarm message string (including date, time, and user name of acknowledging operator) shall be stored in a selected file on the workstation hard disk.
- B. It shall be possible for any operator to receive a summary of all alarms regardless of acknowledgement status; for which a particular recipient is enrolled for notification; based on current event state; based on the particular BACnet event algorithm (e.g., change of value, change of state, out of range, and so on); alarm priority; and notification class.
- C. BACnet Alarming Services: All alarms and events shall be implemented using standard BACnet event detection and notification mechanisms. The workstation shall receive BACnet alarm and event notifications from any gateway or BACnet controller in the system and display them to an operator. Either intrinsic reporting or algorithmic change reporting may be used but the intrinsic reporting method is preferred. The workstation shall also log alarms and events, provide a way for an operator with sufficient privilege to acknowledge alarms, and log acknowledgements of alarms. It shall be possible for an operator to receive, at any time, a summary of all alarms that are currently in effect at any site whether or not they have been acknowledged. Operators shall also be able to view and change alarm limits for any alarm at the appropriate password level.
- D. Alarm Historical Database: The database shall store all alarms and events object occurrences in an ODBC or an OLE database-compliant relational database. Provide a commercially available ODBC driver or OLE database data provider, which would allow applications to access the data using standard Microsoft Windows Data Services.

37 2.07 TRENDING

- A. The software shall display historical data in both a tabular and graphical format. The requirements of this trending shall include the following:
 - 1. Provide trends for all physical points, virtual points and calculated variables.
 - 2. BACnet Trend Objects are preferred but where not possible trend data shall be stored in relational database format as specified in herein under Data Acquisition and Storage.
 - 3. In the graphical format, the trend shall plot at least 4 different values for a given time period superimposed on the same graph. The 4 values shall be distinguishable by using unique colors. In printed form the 4 lines shall be distinguishable by different line symbology. Displayed trend graphs shall indicate the engineering units for each trended value.
 - 4. The sample rate and data selection shall be selectable by the operator.
 - 5. The trended value range shall be selectable by the operator.
 - 6. Where trended values on one table/graph are COV, software shall automatically fill the trend samples between COV entries.
 - B. Control Loop Performance Trends: Controllers incorporating PID control loops shall also provide high resolution sampling in less than six second increments for verification of control loop performance.

- C. Data Buffering and Archiving: Trend data shall be buffered at the BC, and uploaded to hard disk storage when archival is desired. All archived trends shall be transmitted to the on-site OWS or CSS as applicable. Uploads shall occur based upon a user-defined interval, manual command, or automatically when the trend buffers become full.
 - D. Time Synchronization: Provide a time master that is installed and configured to synchronize the clocks of all BACnet devices supporting time synchronization. Synchronization shall be done using Coordinated Universal Time (UTC). All trend sample times, both BACnet and LonTalk, shall be able to be synchronized. The frequency of time synchronization message transmission shall be selectable by the operator.

10 2.08 DYNAMIC PLOTTING

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A. Provide a utility to dynamically plot in real-time at least 4 values on a given 2-dimensional dynamic plot/graph with at least two Yaxes. At least 5 dynamic plots shall be allowed simultaneously.

14 2.09 DATA ACQUISITION AND STORAGE

- A. All points included in the typical equipment point list must be represented in a common, open or accessible format. All points should be provided as BACnet standard analog, binary, schedule, or trend objects when possible. Naming conventions for these points and network addressing are discussed in the 'Point Naming Conventions' paragraph below.
- B. Non-BACnet data from the BAS shall be stored in relational database format. The format and the naming convention used for storing the database files shall remain consistent across the database and across time. The relational structure shall allow for storage of any additional data points, which are added to the BAS in future. The metadata/schema or formal descriptions of the tables, columns, domains, and constraints shall be provided for each database.
- C. The database shall allow applications to access the data while the database is running. The database shall not require shutting down in order to provide read-write access to the data. Data shall be able to be read from the database without interrupting the continuous storage of trend data being carried by the BAS.
- D. The database shall be ODBC or OLE database compliant. Provide a commercially-available ODBC driver or OLE database data provider, which would allow applications to access the data via Microsoft Windows standard data access services.

31 2.10 TOTALIZATION

- A. The software shall support totalizing analog, digital, and pulsed inputs and be capable of accumulating, storing, and converting these totals to engineering units used in the documents. These values shall generally be accessible to the Operator Interfaces to support management-reporting functions.
- B. Totalization of electricity use/demand shall allow application of totals to different rate periods, which shall be user definable.
- When specified to provide electrical or utility Use/Demand, the Contractor shall obtain from the local utility all information required to obtain meter data, including k factors, conversion constants, and the like.

41 2.11 EQUIPMENT SCHEDULING

- 42 A. Provide a graphic utility for user-friendly operator interface to adjust equipment-operating schedules.
- 44 B. All schedules shall be implemented using BACnet objects and messages. All building systems with date and time scheduling requirements shall have schedules represented by the BACnet

1 Schedule object. All operators shall be able to view the entries for a schedule. Operators with sufficient privilege shall be able to modify schedule entries from any BACnet workstation. 2 3 C. Scheduling feature shall include multiple seven-day master schedules, plus holiday schedule. each with start time and stop time. Master schedules shall be individually editable for each day 4 5 and holiday. 6 D. Scheduling feature shall allow for each individual equipment unit to be assigned to one of the master schedules. 7 8 E. Timed override feature shall allow an operator to temporarily change the state of scheduled 9 equipment. An override command shall be selectable to apply to an individual unit, all units 10 assigned to a given master schedule, or to all units in a building. Timed override shall terminate 11 at the end of an operator selectable time, or at the end of the scheduled occupied/unoccupied 12 period, whichever comes first. A password level that does not allow assignment of master schedules shall allow a timed override feature. 13 14 F. A yearly calendar feature shall allow assignment of holidays, and automatic reset of system real 15 time clocks for transitions between daylight savings time and standard time. 2.12 16 POINT STRUCTURING AND NAMING 17 A. General: The intent of this section is to require a consistent means of naming points across the 18 DC Government network. Contractor shall configure the systems from the perspective of the entire network, not solely the local project. The following requirement establishes a standard for 19 20 naming points and addressing Buildings, Networks, Devices, Instances, and the like. Native 21 BACnet systems shall also use this naming convention. For non-BACnet systems, the naming 22 convention shall be implemented as much as practical, and any deviations from this naming 23 convention shall be approved by the DC Government. 24 B. Point Summary Table 25 The term 'Point' is a generic description for the class of object represented by analog and 26 binary inputs, outputs, and values. 27 With each schematic, Contractor shall provide a Point Summary Table listing: 28 Building number and abbreviation 29 b) System type 30 c) Equipment type 31 d) Point suffix 32 e) Full point name (see Point Naming Convention paragraph) 33 f) Point description 34 Ethernet backbone network number. g) 35 h) Network number 36 i) Device ID 37 j) Device MAC address 38 k) Object ID (object type, instance number) 39 Engineering units. 40 Additional fields for non-BACnet systems shall be appended to each row. Point Summary 41 Table shall be provided in both hard copy and in electronic format (ODBC-compliant). 42 4. Point Summary Table shall also illustrate Network Variables/BACnet Data Links. 43 The BAS Contractor shall coordinate with the DC Government's representative and compile

and submit a proposed Point Summary Table for review prior to any object programming or

project startup.

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- 6. The Point Summary Table shall be kept current throughout the duration of the project by the Contractor as the Master List of all points for the project. Project closeout documents shall include an up-to-date accurate Point Summary Table. The Contractor shall deliver to the DC Government the final Point Summary Table prior to final acceptance of the system. The Point Summary Table shall be used as a reference and guide during the commissioning process.
- 7. The Point Summary Table shall contain all data fields on a single row per point. The Point Summary Table is to have a single master source for all point information in the building that is easily sorted and kept up-to-date. Although a relational database of Device ID-to-point information would be more efficient, the single line format is required as a single master table that will reflect all point information for the building. The point description shall be an easily understandable English-language description of the point.

Point Summary Table Example Row Headers and Examples

(Transpose for a single point per row format)

Building Number	0006
Building Association	ZZ = no association (default to ZZ)
System Type	Cooling
Equipment Type	Chiller
Point Suffix	CHLR1KW
*Point Name (Object Name)	0006ZZ.COOLING.CHILLER.CHLR1KW
*Point Description (Object Description)	Chiller 1 kW
Ethernet Network Number	600
Network Number	610
Device ID	1024006
Device MAC address	24
Object Type	Al
Instance Number	4
Engineering Units	KW
Network Variable?	True
Server Device	1024006
Client Devices	1028006
Included with Functional	

^{*} Represents information that shall reside in the relevant BACnet property for the object

C. Point Naming Convention

- All point names shall adhere to the format as established below. Said objects shall include all physical I/O points, calculated points used for standard reports, and all application program parameters. For each BAS object, a specific and unique BACnet object name shall be required.
- 2. For each point, four (4) distinct descriptors shall be linked to form each unique object name: Building, System, Equipment, and Point. All keyboard characters except a space are allowable. Each of the four descriptors must be bound by a period to form the entire object name. Reference the paragraphs below for an example of these descriptors.
- 3. The DC Government shall designate the *Building* descriptor. The *System* descriptor shall further define the object in terms of air handling, cooling, heating, or other system The *Equipment* descriptor shall define the equipment category; e.g., Chiller, Air Handler, or other equipment. The *Point* descriptor shall define the hardware or software type or function associated with the equipment; e.g., supply temperature, water pressure, alarm, mixed air temperature setpoint, etc. and shall contain any numbering conventions for multiples of equipment; e.g., CHLR1KW, CHLR2KW, BLR2AL (Boiler 2 Alarm), HWP1ST (Hot Water Pump 1 Status).

4. A consistent object (point) naming convention shall be utilized to facilitate familiarity and operational ease. Inter-facility consistency shall be maintained to ensure transparent operability to the greatest degree possible. The table below details the object naming convention and general format of the descriptor string.

BACnet Object Name Requirements

Descriptors		Comment
Building Number &	0006ZZ	
Building Association	0134ZZ	
System	AIRHANDLING	
	EXHAUST	
	HEATING	Boilers and ancillary equipment
	COOLING	Chillers and ancillary equipment
	UTILITY	Main electrical and gas meters
	ENDUSE	Specific building loads by type
	MISC	
Equipment	BOILERS	Non-specific boiler system points
	CHILLERS	Non-specific chiller system points
	FACILITY	
	TOWERS	
	WEATHER	
Point Suffix	See Input/Output point s	ummary table for conventions

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- 5. Examples: Within each object name, the descriptors shall be bound by a period. Within each descriptor, words shall not be separated by dashes, spaces, or other separators as follows:
- a) 0006ZZ.COOLING.CHILLERS.CHWP1ST
 - b) 0006ZZ.HEATING.BOILERS.BLR1CFH
- D. Device Addressing Convention:
 - 1. BACnet network numbers and Device Object IDs shall be unique throughout the network.
 - All assignment of network numbers and Device Object IDs shall be coordinated with the DC Government.
 - 3. Each Network number shall be unique throughout all facilities and shall be assigned in the following manner unless specified otherwise:
 - BBBFF, where: BBB = 1-655 assigned to each building, FF = 00 for building backbone network, 1-35 indicating floors or separate systems in the building.
 - 4. Each Device Object Identifier property shall be unique throughout the system and shall be assigned in the following manner unless specified otherwise:
 - XXFFBBB, where: XX = number 0 to 40, FF = 00 for building backbone network, 1-35 indicating floors or separate systems in the building. BBB = 1-655 assigned to each building.
 - 5. The BAS Contractor shall coordinate with the DC Government or a designated representative to ensure that no duplicate Device Object IDs occur.
 - Alternative Device ID schemes or cross project Device ID duplication if allowed shall be approved before project commencement by the DC Government.

2.13 OPERATOR INTERFACE GRAPHIC SOFTWARE

A. Graphic software shall facilitate user-friendly interface to all aspects of the System Software specified above. The intent of this specification is to require a graphic package that provides for

1 intuitive operation of the systems without extensive training and experience. It shall facilitate logical and simple system interrogation, modification, configuration, and diagnosis. 2 3 В. Graphic software shall support multiple simultaneous screens to be displayed and resizable in a "Windows'-like environment. All functions excepting text entry functions shall be executable with 4 5 a mouse. C. 6 Graphic software shall provide for multitasking such that third-party programs can be used while the OWS software is on line. Software shall provide the ability to alarm graphically even when 7 8 operator is in another software package. 9 D. Operating system software shall be Microsoft Windows 2000 Professional. 10 E. The software shall allow for DC Government creation of user-defined, color graphic displays of geographic maps, building plans, floor plans, and mechanical and electrical system schematics. 11 These graphics shall be capable of displaying all point information from the database including 12 13 any attributes associated with each point (i.e., engineering units, etc.). In addition, operators shall be able to command equipment or change setpoints from a graphic through the use of the 14 15 F. Screen Penetration: The operator interface shall allow users to access the various system 16 17 graphic screens via a graphical penetration scheme by using the mouse to select from menus or 'button' icons. Each graphic screen shall be capable of having a unique list of other graphic 18 screens that are directly linked through the selection of a menu item or button icon. 19 20 G. Dynamic Data Displays: Dynamic physical point values shall automatically updated at a 21 minimum frequency of 6 updates per minute without operator intervention. Point value fields 22. shall be displayed with a color code depicting normal, abnormal, override and alarm conditions. 23 H. Point Override Feature: Each displayed point shall be individually enabled/disabled to allow 24 mouse-driven override of digital points or changing of analog points. Such overrides or changes 25 shall occur in the control unit, not just in the workstation software. The graphic point override 26 feature shall be subject to password level protection. Points that are overridden shall be 27 reported as an alarm, and shall be displayed in a coded color. The alarm message shall include 28 the operator's user name. A list of points that are currently in an override state shall be 29 available through menu selection. I. 30 Dynamic Symbols: Provide a selection of standard symbols that change in appearance based 31 on the value of an associated point. 32 Analog symbol: Provide a symbol that represents the value of an analog point as the 33 length of a line or linear bar. 34 Digital symbol: Provide symbols such as switches, pilot lights, rotating fan wheels, etc. to 35 represent the value of digital input and output points. 36 Point Status Color: Graphic presentations shall indicate different colors for different point 37 statuses. (For instance, green = normal, red = alarm, gray (or '???') for non-response. J. 38 Graphics Development Package: Graphic development and generation software shall be 39 provided to allow the user to add, modify, or delete system graphic displays. 40 The Contractor shall provide libraries of pre-engineered screens and symbols depicting 41 standard air handling unit components (e.g. fans, cooling coils, filters, dampers, etc.), mechanical system components (e.g., pumps, chillers, cooling towers, boilers, etc.), 42 complete mechanical systems (e.g. constant volume-terminal reheat, VAV, etc.) and 43 44 electrical symbols. 45 The Graphic Development Package shall use a mouse or similar pointing device to allow the user to perform the following: 46 47 a) Define symbols 48 Position items on graphic screens b) 49 c) Attach physical or virtual points to a graphic

Define background screens

1 e) Define connecting lines and curves 2 f) Locate, orient and size descriptive text 3 g) Define and display colors for all elements 4 h) Establish correlation between symbols or text and associated system points or other 5 displays. 6 i) Create hot spots or link triggers to other graphic displays or other functions in the 7 software. 8 2.14 REMOTE PERSONAL COMPUTER WORKSTATION GRAPHIC SOFTWARE 9 A. Remote graphic operator software shall provide all the functionality specified for the local graphic 10 software. It shall also provide for dial-up communications using the specified modems via 11 commercial telephone lines to connect to the Local Supervisory or Primary LAN, and using the 12 Internet. 13 В. Software shall not require graphic images to be sent across the phone lines or 56Kbps or slower 14 Internet connection. Graphic images shall reside on the remote operator workstation hard drive and all licenses must be provided for the graphic software on the remote machine. . Exceptions 15 to this requirement include: 16 17 System configuration uses an Internet server and presents web pages that can be pulled up using a standard browser. 18 System configuration uses an Internet server and presents the standalone application 19 running locally but controlled via a remote browser. Operator Interface Graphical Software 20 application must therefore support multi-instancing to allow multiple simultaneous remote 21 22. connections and use of the graphic software. 23 C. Software shall be capable of initiating communication to the any LAN, upon user command, to 24 perform all specified functions. Software shall be capable of initiating communication to the LANs in accordance with user-programmed time schedules to upload trend and report data. 25 26 Software shall be capable of communicating from the LAN in accordance with user-programmed 27 time schedules to report alarms, upload trend, and report data. Software shall automatically 28 terminate the communication whenever all applications requiring modem connection are closed. 29 PART III. PART 3 - EXECUTION 30 3.01 SYSTEM CONFIGURATION 31 A. Contractor shall thoroughly and completely configure BAS system software, supplemental 32 software, network communications, CSS, OWS, portable operators terminal, printer, and remote 33 communications. 34 3.02 SITE-SPECIFIC APPLIC ATION PROGRAMMING 35 Provide all database creation and site-specific application control programming as required by Α. 36 these Specifications, national and local standards and for a fully functioning system. Contractor 37 shall provide all initial site-specific application programming and thoroughly document 38 programming. Generally meet the intent of the written sequences of operation. It is the 39 Contractor's responsibility to request clarification on sequence issues that require such 40 clarification. В. All site-specific programming shall be fully documented and submitted for review and approval, 41 42 both prior to downloading into the panel, at the completion of functional performance testing, and 43 at the end of the warranty period. 44 C. All programming, graphics and data files must be maintained in a logical system of directories

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with self-explanatory file names. All files developed for the project will be the property of the DC

Government and shall remain on the workstation(s)/server(s) at the completion of the project.

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3.03

PASSWORD SETUP 2 A. Set up the following password levels to include the specified capabilities: 3 Level 1: (DC Government's BAS Administrator) 4 a) Level 2 capabilities 5 b) View, add, change and delete user names, passwords, password levels 6 All unrestricted system capabilities including all network management functions. c) 7 2. Level 2: (Programmer) 8 Level 3 capabilities a) 9 b) Configure system software 10 Modify control unit programs c) 11 d) Modify graphic software 12 e) Essentially unrestricted except for viewing or modifying user names, passwords, 13 password levels 14 3. Level 3: (Senior HVAC Technician) 15 Level 4 capabilities 16 Override output points b) 17 Change setpoints c) 18 d) Change equipment schedules 19 Exit BAS software to use third party programs e) 20 Level 4: (Junior HVAC Technician) 21 a) Level 5 capabilities 22 b) Acknowledge alarms 23 c) Temporarily override equipment schedules 24 5. Level 5: (HVAC Technician Trainee) 25 a) Display all graphic data 26 b) Trend point data 27 B. Contractor shall assist DC Government's operators with assigning user names, passwords and 28 password levels. 3.04 29 POINT PARAMETERS 30 A. Provide the following minimum programming for each analog input: 31 1. Name 32 2. Address 33 3. Scanning frequency or COV threshold 34 4. **Engineering units** 35 5. Offset calibration and scaling factor for engineering units 36 High and low alarm values and alarm differentials for return to normal condition 6. High and low value reporting limits (reasonableness values), which shall prevent control 37 7. 38 logic from using shorted or open circuit values. 39

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2 3 4 5 6 7			8.	Default value to be used when the actual measured value is not reporting. This is required only for points that are transferred across the primary and/or secondary controlling networks and used in control programs residing in control units other than the one in which the point resides. Events causing the default value to be used shall include failure of the control unit in which the point resides, or failure of any network over which the point value is transferred.
8 9			9.	Selectable averaging function that shall average the measured value over a user selected number of scans for reporting.
10		B.	Pro	vide the following minimum programming for each analog output:
11			1.	Name
12			2.	Address
13			3.	Output updating frequency
14			4.	Engineering units
15			5.	Offset calibration and scaling factor for engineering units
16			6.	Output Range
17			7.	Default value to be used when the normal controlling value is not reporting.
18		C.	Pro	vide the following minimum programming for each digital input:
19			1.	Name
20			2.	Address
21			3.	Engineering units (on/off, open/closed, freeze/normal, etc.)
22			4.	Debounce time delay
23			5.	Message and alarm reporting as specified
24 25			6.	Reporting of each change of state, and memory storage of the time of the last change of state
26 27			7.	Totalization of on-time (for all motorized equipment status points), and accumulated number of off-to-on transitions.
28		D.	Pro	vide the following minimum programming for each digital output:
29			1.	Name
30			2.	Address
31			3.	Output updating frequency
32			4.	Engineering units (on/off, open/closed, freeze/normal, etc.)
33			5.	Direct or Reverse action selection
34			6.	Minimum on-time
35			7.	Minimum off-time
36			8.	Status association with a DI and failure alarming (as applicable)
37			9.	Reporting of each change of state, and memory storage of the time of the last change of
38				state.
39			10.	
40				number of off-to-on transitions.
41			11.	Default value to be used when the normal controlling value is not reporting.
42	3.05	TREND	<u>)S</u>	
43		A.		ntractor shall establish and store trend logs. Trend logs shall be prepared for each physical
44 45				ut and output point, and all dynamic virtual points such as setpoints subject to a reset edule, intermediate setpoint values for cascaded control loops, and the like as directed by the

DC Government.

- The DC Government will analyze trend logs of the system operating parameters to evaluate В. 1 2 normal system functionality. Contractor shall establish these trends and ensure they are being 3 stored properly.
 - Data shall include a single row of field headings and the data thereafter shall be contiguous. Each record shall include a date and time field or single date stamp. Recorded parameters for a given piece of equipment or component shall be trended at the same intervals and be presented in a maximum of two separate 2-dimensional formats with time being the row heading and field name being the column heading.
 - C. Sample times indicated as COV (±) or change-of-value mean that the changed parameter only needs to be recorded after the value changes by the amount listed. When output to the trending file, the latest recorded value shall be listed with any given time increment record. The samples shall be filled with the latest values also if the points include different time intervals. If the BAS does not have the capability to record based on COV, the parameter shall be recorded based on the interval common to the unit.
 - D. Trending intervals or COV thresholds shall be dictated by the DC Government upon system start-up.
- E. 17 The Contractor shall demonstrate functional trends as specified for a period of 30 days after 18 successful system demonstration before final acceptance of the system.

3.06 19 TREND GRAPHS

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- 20 Prepare controller and workstation software to display graphical format trends. Trended values 21 and intervals shall be the same as those specified
- 22 В. Lines shall be labeled and shall be distinguishable from each other by using either different line 23 types, or different line colors.
- 24 C. Indicate engineering units of the y-axis values; e.g. degrees F., inches w.g., Btu/lb, percent open, 25 etc.
 - The y-axis scale shall be chosen so that all trended values are in a readable range. Do not mix D. trended values on one graph if their unit ranges are incompatible.
- 28 E. Trend outside air temperature, humidity, and enthalpy during each period in which any other 29 points are trended.
- F. 30 All points trended for one HVAC subsystem (e.g. air handling unit, chilled water system, etc.) 31 shall be trended during the same trend period.
 - G. Each graph shall be clearly labeled with HVAC subsystem title, date, and times.

3.07 33 **ALARMS**

- 34 A. Override Alarms: Any point that is overridden through he override feature of the graphic 35 workstation software shall be reported as a Level 3 alarm.
- В. 36 Analog Input Alarms: For each analog input, program an alarm message for reporting whenever the analog value is outside of the programmed alarm limits. Report a 'Return-to-Normal' 38 message after the analog value returns to the normal range, using a programmed alarm differential. The alarm limits shall be individually selected by the Contractor based on the 40 following criteria:
- 41 Space temperature, except as otherwise stated in sequence of operation: Level 3
- 42. Low alarm: 64°F
 - b) Low return-to-normal: 68°F
- 44 High alarm: 85°F c)
- 45 d) High return-to-normal: 80°F

1 2 3 4			 Controlled media temperature other than space temperature (e.g. AHU discharge air temperature, steam converter leaving water temperature, condenser water supply, chilled water supply, etc.): Level 3 (If controlled media temperature setpoint is reset, alarm setpoints shall be programmed to follow setpoint)
5			a) Low alarm: 3°F below setpoint
6			b) Low return-to-normal: 2°F below setpoint
7			c) High alarm: 3°F above setpoint
8			d) High return-to-normal: 2°F above setpoint.
9			3. AHU mixed air temperature: Level 4
10			a) Low alarm: 45°F
11			b) Low return-to-normal: 46°F
12			c) High alarm: 90°F
13			d) High return-to-normal: 89°F
14			4. Duct Pressure:
15			a) Low alarm: 0.5"w.g. below setpoint
16			b) Low return-to-normal: 0.25"w.g. below setpoint
17			c) High alarm: 0.5"w.g. above setpoint
18			d) High return-to-normal: 0.25"w.g. above setpoint
19			5. Space humidity:
20			a) Low alarm: 35%
21			b) Low return-to-normal: 40%
22			c) High alarm: 75%
23			d) High return-to-normal: 70%
24 25 26 27 28 29		C.	HOA Switch Tampering Alarms: The Sequences of Operation are based on the presumption that motor starter Hand-Off-Auto (HOA) switches are in the 'Auto' position. If a motorized equipment unit starts without a prior start command from the FMS, (as sensed by status sensing device), then FMS shall perform the remaining sequence as specified. BAS shall also enunciate the following Level 5 alarm message if status indicates a unit is operational when the run command is not present:
30 31 32 33			 DEVICE XXXX FAILURE: Status is indicated on {the device} even though it has been commanded to stop. Check the HOA switch, control relay, status sensing device, contactors, and other components involved in starting the unit. Acknowledge this alarm when the problem has been corrected.
34 35		D.	Maintenance Alarms: Enunciate Level 5 alarms when runtime accumulation exceeds a value specified by the operator
36 37			 DEVICE XXXX REQUIRES MAINTENANCE. Runtime has exceeded specified value since last reset.
38 39		E.	See requirements for additional equipment-specific alarms specified in Section 15958 - Sequences of Operation.
40	3.08	<u>GRAPH</u>	HIC SCREENS
41 42 43 44		A.	Floor Plan Screens: The contract document drawings will be made available to the Contractor in AutoCAD format upon request. These drawings may be used only for developing backgrounds for specified graphic screens; however the DC Government does not guarantee the suitability of these drawings for the Contractor's purpose.

- 1. Provide graphic floor plan screens for each floor of the building. Indicate the location of all equipment that is not located on the equipment room screens. Indicate the location of temperature sensors associated with each temperature-controlled zone (i.e., VAV terminals, fan-coils, single-zone AHUs, etc.) on the floor plan screens. Zone background color shall change based on the temperature offset from setpoint. Display the space temperature point adjacent to each temperature sensor symbol. Use a distinct line symbol to demarcate each terminal unit zone boundary. Use distinct colors to demarcate each air handling unit zone. Mechanical floor plan drawings will be made available to the contractor upon request for the purpose of determining zone boundaries. Indicate room numbers as provided by the DC Government. Provide a drawing link from each space temperature sensor symbol and equipment symbol shown on the graphic floor plan screens to each corresponding equipment schematic graphic screen.
- 2. Provide graphic floor plan screens for each mechanical equipment room and a plan screen of the roof. Indicate the location of each item of mechanical equipment. Provide a drawing link from each equipment symbol shown on the graphic plan view screen to each corresponding mechanical system schematic graphic screen.
- 3. If multiple floor plans are necessary to show all areas, provide a graphic building key plan. Use elevation views and/or plan views as necessary to graphically indicate the location of all of the larger scale floor plans. Link graphic building key plan to larger scale partial floor plans. Provide links from each larger scale graphic floor plan screen to the building key plan and to each of the other graphic floor plan screens.
- 4. Provide a graphic site plan with links to and from each building plan.
- B. System Schematic Screens: Provide graphic system schematic screen for each HVAC subsystem controlled with each I/O point in the project appearing on at least one graphic screen. System graphics shall include flow diagrams with status, setpoints, current analog input and output values, operator commands, etc. as applicable. General layout of the system shall be schematically correct. Input/output devices shall be shown in their schematically correct locations. Include appropriate engineering units for each displayed point value. Verbose names (English language descriptors) shall be included for each point on all graphics; this may be accomplished by the use of a pop-up window accessed by selecting the displayed point with the mouse. Indicate all adjustable setpoints on the applicable system schematic graphic screen or, if space does not allow, on a supplemental linked-setpoint screen.
 - 1. Provide graphic screens for each air handling system. Indicate outside air temperature and enthalpy, and mode of operation as applicable (i.e., occupied, unoccupied, warm-up, cooldown). Link screens for air handlers to the heating system and cooling system graphics. Link screens for supply and exhaust systems if they are not combined onto one screen.
 - 2. Provide a graphic screen for each zone. Provide links to graphic system schematic screens of air handling units that serve the corresponding zone.
 - Provide a cooling system graphic screen showing all points associated with the chillers, cooling towers and pumps. Indicate outside air dry-bulb temperature and calculated wetbulb temperature. Link screens for chilled water and condenser water systems if they cannot fit onto one cooling plant graphic screen.
 - 4. Link screens for heating and cooling system graphics to utility history reports showing current and monthly electric uses, demands, peak values, and other pertinent values.
- C. Bar Chart Screens: On each graphic Bar Chart Screen, provide drawing links to the graphic air handling unit schematic screens.
 - 1. Provide a graphic chilled water valve screen showing the analog output signal of all chilled water valves in a bar chart format, with signals expressed as percentage of fully open valve (percentage of full cooling). Indicate the discharge air temperature and setpoint of each air handling unit, cooling system chilled water supply and return temperatures and the outside air temperature and humidity on this graphic. Provide drawing links between the graphic cooling plant screen and this graphic screen.
 - 2. Provide a graphic heating water valve screen showing the analog output signal of all air handling unit heating water valves in a bar chart format, with signals expressed as percentage of fully open valve (percentage of full heating). Indicate the temperature of the controlled medium (such as AHU discharge air temperature or zone hot water supply temperature) and the associated setpoint and the outside air temperature and humidity.

D. Alarms: Each programmed alarm shall appear on at least one graphic screen. In general, alarms shall be displayed on the graphic system schematic screen for the system that the alarm is associated with (for example, chiller alarm shall be shown on graphic cooling system schematic screen). For all graphic screens, display analog values that are in a 'high alarm' condition in a red color, 'low alarm' condition in a blue color. Indicate digital values that are in alarm condition in a red color.

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END OF SECTION 15955

1 SECTION 15958 - SEQUENCE OF OPERATION

2 PART I. GENERAL

3 1.01 RELATED DOCUMENTS:

- 4 A. Drawings and general provisions of Contract, including the General Conditions and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.
- 7 B. Section 15050 -Basic Mechanical Materials and Methods
- 8 C. Section 15949 Building Automation System (BAS) General
- 9 D. Section 15951 BAS Basic Materials, Interface Devices, and Sensors
- 10 E. Section 15952 BAS Operator Interfaces
- 11 F. Section 15953 BAS Field Panels
- 12 G. Section 15954 BAS Communications Devices
- 13 H. Section 15955 BAS Software
- I. Section 15959 BAS Commissioning

15 1.02 <u>SYSTEM DESCRIPTION</u>

- 16 A. The HVAC systems being controlled include:
- 17 1. Air Handling Units
- 18 2. VAV and CV Terminal Units
- Heat Recovery Units
- Heat Pump Water System
- 21 5. Heating Water System
- 22 6. Radiators and Unit Heaters
- Water Source Heat Pumps
- 24 8. Exhaust and Ventilation Fans
- 25 B. This Section defines the manner and method by which controls function.

26 1.03 SUBMITTALS

- A. Refer to Section 15949 and Division 1 for requirements for control shop drawings, product data, Users Manual, etc.
- B. Programming Manual: Provide DDC system programming manual as well as documentation of site-specific programming prior to the start of Acceptance Phase.

31 1.04 PROJECT RECORD DOCUMENTS

- 32 A. Within two weeks of the completion of commissioning, provide record documents to represent the final control configuration with actual setpoints and tuning parameters as existed at acceptance.
- B. Record documents shall be modified control drawings with the actual installed information.
 Drawings shall be delivered in both reproducible hard copy and electronic format in
 AutoCAD 2002 drawing files. Provide all supporting files, blocks, fonts, etc. required by the drawings.
- 39 C. Provide final points list with as describes above

D. 1 Provide final detailed wiring diagrams with all wire numbers and termination points 2 indicated 3 E. Accurately record final sequences and control logic made after submission of shop 4 drawings. 5 1.05 **DEFINITIONS/ABBREVIATIONS** 6 A. AH: Air Handler 7 B. AHU: Air Handling Unit 8 C. HPW: Heat Pump Water D. 9 MVR: Minimum required ventilation rate (ASHRAE 62) E. 10 OA: Outdoor Air F. 11 HW: Heating water G. Physical Point: A point on the BAS that is physically connected to an I/O device such that 12 13 a hardware point exists 14 H. Virtual Point: A point to store values (i.e.: a setpoint) that do not represent a physical 15 device 16 17 18 PART II. **PRODUCTS** 19 20 Not Used 21 22. 23 PART III. **EXECUTION** 24 3.01 **GENERAL** 25 A. Sequences specified herein indicate the functional intent of the systems operation and 26 may not fully detail every aspect of the programming that may be required to obtain the 27 indicated operation. Contractor shall provide all programming and necessary control 28 devices to obtain the sequences/system operation indicated. Note: Not all devices, 29 terminology or strategies indicated in the following sections may apply to the systems and 30 their control sequences indicated in this section. Refer to control sequences for each 31 system in this section for specific controls requirements. 32 33 B. When an air handling unit is not in operation, control devices shall remain in the "off" 34 positions. "Off" positions may differ from the "normal" (meaning failed) position. Except as 35 specified otherwise, "off" and "normal" positions of control devices shall be as follows:

Device	"Off" Position	"Normal" Position
Heating coil valves	Closed	Open
Cooling coil valves	Closed	Closed
Outside air damper	Closed	Closed
Return air damper	Open	Open
Exhaust/relief air damper	Closed	Closed

C. Except as specified otherwise, throttling ranges, proportional bands, and cycle differentials shall be centered on the associated setpoint. All modulating feedback control loops shall

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1 2 3 4 5		include the capability of having proportional, integral, and derivative action. Unless the loop is specified "proportional only" or "P+I", Contractor shall apply appropriate elements of integral and derivative gain to each control loop which shall result in stable operation, minimum settling time, and shall maintain the primary variable within the specified maximum allowable variance.
6 7	D.	Scheduling Terminology: When air handlers are scheduled throughout the day, the following defines the terminology used:
8 9 10 11 12		 Occupied Period: The period of time when the building is in use and occupied. Unless indicated otherwise, this period is defined as 6:00 AM - 6:00 PM weekdays. Exclude all Federal holidays. Generally systems will be fully operational throughout this period and ventilation air shall be continuously introduced. Space temperature setpoints will generally be in the "normal" range of 69°-77°F.
13 14		2. Unoccupied period: The period of time when the building or zone is not in use, and unoccupied. Ventilation air shall not be introduced.
15 16 17 18 19		3. Preoccupancy Period: Time prior to the Occupied period when the systems are returning the space temperatures from setback to "normal" or occupied setpoints (warm-up and cool-down). Ventilation air shall not be introduced unless outside air conditions permit free cooling. Time period shall be determined by an optimum start strategy unless otherwise specified.
20 21 22 23		4. Setback Period: Setback will typically coincide with the end of the occupied period and end with the start of the preoccupancy period, however it shall be provided with its own schedule. Generally systems will be off except to maintain a "setback" temperature.
24 25 26	E.	Where any sequence or occupancy schedule calls for more than one motorized unit to start simultaneously, the BAS start commands shall be staggered by 5 second (adj.) intervals to minimize inrush current.
27 28 29	F.	Alarm messages specified throughout the sequences are assigned to discrete priority levels. Priority levels dictate the handling and destination of alarm reports, and are defined in Section 15955 - ATC System Software and Programming.
30 31 32	G.	Wherever a value is indicated as adjustable (adj.), it shall be modifiable, with the proper password level, from the operator interface or via a function block menu. For these points, it is unacceptable to have to modify programming statements to change the setpoint.
33 34 35 36 37 38 39 40 41 42 43	H.	When a power failure is detected in any phase, the BAS start commands shall be retracted immediately from all electrically powered units served by the failed power source. If the associated Building Controller (BC) is powered by normal or emergency power, it may monitor its own power source as an indication of power status. If the BC is powered by uninterruptible power supply (UPS), or if BC is not capable of monitoring its own power for use in sequences, Contractor shall provide at least one voltage monitor (three phase when applicable) per building. When the BAS detects that power has been restored, all equipment for which the BAS start command had been retracted shall be automatically restarted on staggered 5-second intervals to minimize inrush current. When loss of equipment status coincides with a power failure, system shall not alarm individual equipment failures. Instead, only a single Level 2 alarm shall be enunciated as follows:
44 45		 BUILDING XXXX POWER FAILURE: Notify electric shop. Acknowledge alarm when power is restored.
46 47	I.	Where reset action is specified in a sequence of operation, but a reset schedule is not indicated on the drawings, one of the following methods shall be employed:
48 49 50		 Contractor shall determine a fixed reset schedule, which shall result in stable operation and shall maintain the primary variable within the specified maximum allowable variance.
51 52 53 54		 A floating reset algorithm shall be used which increments the secondary variable setpoint (setpoint of control loop being reset) on a periodic basis to maintain primary variable setpoint. The recalculation time and reset increment shall be chosen to maintain the primary variable within the specified maximum allowable variance.

- 3. Primary variable shall control the devices directly using a PID feedback control loop without resetting the secondary variable. However, the control devices shall still modulate as necessary to maintain upper and lower limits on the secondary variable. Proportional band, integral gain, and derivative term shall be selected to maintain the primary variable within the specified maximum allowable tolerance while minimizing overshoot and settling time. Contractor shall gain prior approval for implementing this method of reset.
- J. Where a supply air temperature or duct pressure setpoint is specified to be reset by the space temperature of the zones calling for the most cooling/heating, the following method shall be employed:
 - 1. A floating reset algorithm shall be used which increments the secondary variable (e.g., supply air temperature or duct pressure) setpoint on a periodic basis to maintain primary variable (e.g. space temperature) setpoint. The reset increment shall be determined by the quantity of "need heat" or "need cool" requests from individual AAC/ASC's. An AAC/ASC's "need heat" virtual point shall activate whenever the zone's space temperature falls below the currently applicable (occupied or unoccupied) heating setpoint throttling range. An AAC/ASC's "need cool" virtual point shall activate whenever the zone's space temperature rises above the currently applicable (occupied, unoccupied, or economy) cooling setpoint throttling range. The recalculation time and reset increment shall be chosen to maintain the primary variable within the specified maximum allowable variance while minimizing overshoot and settling time. Reset range maximum and minimum values shall limit the setpoint range.
- K. Where a supply air temperature, duct pressure, or differential water pressure setpoint is specified to be reset by valve or damper position of the zone or zones calling for the most cooling/heating, the following method shall be employed:
 - 1. A floating reset algorithm shall be used which increments the secondary variable (e.g., supply air temperature, pipe or duct pressure) setpoint on a periodic basis to maintain primary variable (e.g. cooling valve, heating valve, damper position) setpoint of 85% open. The reset increment shall be calculated based on the average position of the quantity of the worst (most open valve/damper) zone(s) as specified. The recalculation time, reset increment and control device position influence shall be chosen to maintain the primary variable within the specified maximum allowable variance while minimizing overshoot and settling time. The BAS analog output value shall be acceptable as indicating the position of the control device.
 - 2. Alternatively to continuously calculating the average of the quantity of worst valve/damper positions, a method similar to the one described above may be employed whereby the "need heat" or "need cool" virtual point shall increment by one unit each time a zone's valve/damper position rises to greater than 95%. The quantity of "need heat" or "need cool" points shall then be the basis for reset.
- L. Where "prove operation" of a device (generally controlled by a digital output) is indicated in the sequence, it shall require that the BAS shall, after an adjustable time delay after the device is commanded to operate (feedback delay), confirm that the device is operational via the status input. If the status point does not confirm operation after the time delay or anytime thereafter for an adjustable time delay (debounce delay) while the device is commanded to run, an alarm shall be enunciated audibly and via an alarm message at the operator interface and print at the alarm printers. A descriptive message shall be attached to the alarm message indicating the nature of the alarm and actions to be taken. Contractor shall provide messages to meet this intent.
- M. BAS shall provide for adjustable maximum rates of change for increasing and decreasing output from the following analog output points:
 - 1. Speed control of variable speed drives
 - 2. Chiller supply water temperature setpoint reset
 - 3. Chiller demand limit
 - 4. Travel rate of tower isolation and chiller isolation valves
- N. Wherever a value is indicated to be dependent on another value (i.e.: setpoint plus 5°F) BAS shall use that equation to determine the value. Simply providing a virtual point that

1 the operator must set is unacceptable. In this case three virtual points shall be provided. 2 One to store the parameter (5°F), one to store the setpoint, and one to store the value that 3 is the result of the equation. 3.02 4 DEMAND LIMITING CONTROL 5

- A. BAS shall monitor kW demand over a 15-minute sliding window period.
 - В. Demand limiting shall be disabled during the winter billing period. When demand limiting is enabled, it shall be possible for the operator to disable it on a daily basis during, but it shall be automatically re-enabled each day at 12 midnight.
 - C. On a rise in kW to within 200 kW (adj.) of setpoint, a Level 4 alarm shall be enunciated and BAS shall begin to make one "load shed" command every 3 minutes (adj.). On a fall in kW to 200 kW less than the demand setpoint, BAS shall begin to broadcast one "load restore" command every 3 (adj.) minutes on a first shed, first restored basis. If demand exceeds the demand setpoint and there are no more loads left to shed, the demand setpoint shall be increased to the maximum demand experienced. Demand setpoint shall be automatically reset to an adjustable value at the beginning of each billing period.
 - D. "Loads" available for shedding are defined elsewhere in this specification section.
- E. On a rise in kW to within 50 kW (adj.) of setpoint, a Level 3 and Level 4 alarm shall be enunciated.

3.03 AIR HANDLING UNITS - GENERAL

- A. Logic Strategies: The BAS shall fully control the air handlers. Generally the BAS shall energize the AH (start the fans and activate control loops) as dictated for each air handler. The following indicates when and how the BAS shall energize the AHs and control various common aspects of them. The following "logic strategies" shall be included by reference with each air handler with any specific clarifications required:
 - Scheduled Occupancy: BAS shall determine the occupancy periods (occupied, unoccupied, preoccupancy, and setback) as defined above. The following details the common control aspects related to the scheduled occupancy.
 - Occupied Period: BAS shall energize the AH during all occupied periods. Note that the beginning of the occupancy period shall be set sufficiently before the actual start of occupancy to obtain the required building component of ventilation per ASHREA 62. Specific times shall be as directed by the A/E. Minimum OA flow setpoint shall be as scheduled on the drawings. "Normal" setpoints shall apply.
 - Unoccupied Period: Minimum OA flow shall be 0 CFM or the minimum OA damper position shall be 0%. If during the unoccupied period there is a request for occupancy override, the occupancy mode shall become active for an adjustable period. The unoccupied period and the preoccupancy period will typically overlap.
 - Setback Period: the BAS shall deenergize the unit except as required to maintain a setback temperature as indicated in the individual sequences with a 5°F cycle differential. Generally, where setback temperatures apply in multiple zones, the worst zone shall control the system. Setback setpoints generally apply except during preoccupancy and night purge. If during the unoccupied period there is a request for occupancy override, the occupancy mode shall become active for an adjustable period.
 - Preoccupancy: BAS shall energize the AH continuously during the preoccupancy period. Minimum OA flow shall be 0 CFM or the minimum OA damper position shall be 0%. "Normal" setpoints shall apply. Preoccupancy duration shall be one of the following as specified by reference:

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1 2		1)	Fixed: The duration of the preoccupancy period shall be fixed as scheduled by the operator/
3 4 5 6 7 8 9		2)	Optimum: The duration of the morning warm -up period shall vary according to outside air temperature and space temperature such that the space temperature rises to occupied period heating setpoint at the beginning of, but not before, the scheduled occupied period. The duration of the cool-down period shall vary according to outside air temperature and space temperature such that the space temperature falls to the occupied period cooling setpoint at the beginning of, but not before, the scheduled occupied period
11 12 13 14 15 16 17 18 19	g s tu A s fa E	graphic icor shall energi emperature AND outside pace temp all(s) below	Cycle: The night purge cycle shall be enabled/disabled manually via a n. While the mode is enabled and during the unoccupied period, BAS ze the unit when the OA temperature falls to 10°F below space AND space temperature is greater than the occupied heating setpoint a air enthalpy is below 24 Btu/#. BAS shall deenergize AH when the erature falls to within 5°F of OA temperature OR the space temperature of the occupied heating setpoint OR outdoor air enthalpy rises to 25 Btu/#. hight purge cycle any applicable terminal units shall be indexed to their oints
20 21			A Control: BAS shall maintain minimum ventilation during the occupied following strategies may apply:
22 23 24 25 26 27 28	а	dampe minime capabl baland be fully	ced Position: During the occupied period, applicable mixing and OA ers shall never be positioned less than the position set for the required um OA ventilation rate. If the air handler has a single OA damper that is le of economizer, the minimum position output shall be determined by the er. If the AH has a two position minimum OA damper, that position shall y open to its balanced position. This logic strategy is only applicable to ant volume Ahs.
29 30 31 32 33 34 35 36	b	OA da Minimi exhau minimi "samp respor	Balanced Position: During the occupied period, applicable mixing and mpers shall never be positioned less than the minimum position. um position shall be reset between limits of a position delivering system st make-up air CFM and the design minimum position delivering design um CFM to maintain a CO ₂ setpoint of 900 ppm (adj.). Loop shall be a le and bump" or dynamic proportional only loop tuned for the slownse. The balancer shall determine the minimum position outputs at both ne points. This logic strategy is only applicable to constant volume Ahs.
37 38 39 40 41	c	dampe MVR a shall b	er Controlled Fixed: During the occupied period, applicable mixing ers shall be modulated to maintain an OA flow rate of no less than the as dictated in the design and required by ASHRAE 62. Setpoint flow rates be provided by the A/E. Flow rate shall be determined in any of the ng ways as specified for the particular AH:
42		1)	Measured directly by an OA flow station
43 44		2)	As determined by CO_2 mixing equations using the SA, OA, and RA CO_2 sensors
45 46 47 48 49 50 51 52	c	dampe shall b design shall b slow re	er Controlled Reset: During the occupied period, applicable mixing ers shall be modulated to maintain an OA flow rate setpoint. Setpoint he reset between limits of system exhaust make-up air CFM and the minimum CFM to maintain an RA CO ₂ setpoint of 900 ppm (adj.). Loop he a "sample and bump" or dynamic proportional only loop tuned for the esponse. Setpoint flow rates shall be provided by the A/E. Flow rate he determined in any of the following ways as specified for the particular
53		1)	Measured directly by an OA flow station
54 55		2)	As determined by CO_2 mixing equations using the SA, OA, and RA CO_2 sensors

1 2 3 4 5		e)	be set remair air dar	Air Plenum Pressure Control: Minimum position of the OA damper shall to obtain the design required minimum OA. This balanced position shall negative to minimum loop is active. BAS shall control the return mper to maintain a mixed air plenum pressure (relative to outside)
5 6 7			referei	nt, which will be specified by the balancer (25"). Ensure the OA nce pressure is adequately dampened against wind fluctuations using a esistance static tip, restrictors, and air volume capacitance.
8 9	4.	VAV follo		Fan Capacity Control: BAS shall control the output of the return fan as
0 1 2		a)		racking: The return air fan shall run to maintain a return flow setpoint of pply flow minus an offset value. The offset value shall be determined as s:
13			1)	Fixed Differential: It shall be fixed at the design minimum OA value.
14 15 16 7			2)	Differential Reset From RA CO ₂ : It shall be reset between limits of system exhaust make-up air CFM and the design minimum CFM to maintain an RA CO ₂ setpoint of 900 ppm (adj.). Loop shall be a "sample and bump" or dynamic proportional only loop tuned for the slow
18				response. Setpoint flow rates shall be provided by the A/E
19 20 21 22			3)	Differential Reset From Measured OA to Maintain Fixed OA: It shall be reset to maintain the measured minimum OA flow at the design value any time the economizer mode is inactive. Whenever it is inactive, it shall be set to the value that existed when the unit became active
23 24 25 26 27 28 29 30			4)	Differential Reset From Measured OA to Maintain Reset OA When the economizer mode is inactive, it shall be reset to maintain the measured OA flow setpoint. The OA setpoint shall be reset between limits of system exhaust make-up air CFM and the design minimum CFM to maintain an RA CO_2 setpoint of 900 ppm (adj.). Loop shall be a "sample and bump" or dynamic proportional only loop tuned for the slow response. Setpoint flow rates shall be provided by the A/E. Whenever the economizer is active, it shall be set to the value that existed when the unit became active.
32 33 34 35 36		b)	contro the de	led Output Capacity Control: The output for the return fan capacity I shall be rescaled from the output of the to the supply device such that sign minimum OA temperature is maintained at minimum, maximum and ow conditions. The balancing contractor shall determine the coordinated .
37 38 39 40 41 42	5.	cooli any DA F indiv	ing" who mechar PID loop ridual ur icable.	nomizer: BAS shall modulate the mixing dampers to provide "free en conditions merit. The free cooling shall generally be staged before nical cooling. While conditions merit, dampers shall be modulated in a to to maintain mixed air temperature at a setpoint as specified for the nit. Economizer logic shall remain enabled during setback cooling where One of the following strategies shall be used to enable the economizer
14 15 16 17 18 19		a)	Dry Bu energi tempe Econo ORout differe	alb Comparison: Economizer mode shall be active while the unit is zed AND when OA enthalpy fall below 28 btu/# AND outside air rature falls below return air temperature (with 2°F cycle differential). Imizer mode shall be inactive when OA enthalpy rises above 29 btu/# tiside air temperature rises above return air temperature (with 2°F cycle ntial), dampers shall return to their scheduled minimum positions as ed above. Economizer shall remain enabled during setback cooling.
51 52 53 54 55 56		b)	AND v below Econo outside	ulb Switch: Economizer mode shall be active while the unit is energized when OA enthalpy fall below 28 btu/# AND outside air temperature falls the switching setpoint of 70°F (adj.) (with 5°F cycle differential). The switching setpoint of 70°F (adj.) (with 5°F cycle differential). The switching setpoint of 70°F (adj.) (with 5°F cycle differential). The switching setpoint is above 29 btu/# OR is a circle above switching setpoint, dampers shall return to cheduled minimum positions as specified above.

- c) Enthalpy Comparison: Economizer mode shall be active while the unit is energized AND when outside air enthalpy falls below return air enthalpy (with 2btu/# cycle differential). Economizer mode shall be inactive when outside air enthalpy rises above return air enthalpy, dampers shall return to their scheduled minimum positions as specified above.
- Sequenced Heating and Cooling: BAS shall control the heating and cooling coils and airside economizer as detailed for the particular AH. Program logic shall directly prohibit the heating and cooling valves as well as the heating valve and economizer damper to be open (or above minimum) simultaneously. This does not apply to cooling and reheat valves that are used simultaneously for dehumidification. When in economizer mode the cooling valve shall be allowed to open to maintain temperature setpoints when the economizer damper is 100% open for more than 15 minutes and setpoint cannot be maintained. Once the chilled water valve opens the OA damper must remain at 100% open position until the chilled water valve position reaches 0% open.
- 7. Mixed Air Low Limit Override: BAS shall override the signal to the OA damper via a proportional only loop to maintain a minimum mixed air/supply air temperature of 45°F (adj.) (loop shall output 0% at 45°F which shall be passed to the output via a low selector).
- 8. Smoke Pressurization Cycle: when pressurization is commanded by the interface to the fire alarm system, supply fan shall start and deliver 100% outside air to the space. Return fan shall remain off. Hardwired interlock from safeties may still interrupt fan operation. (See damper and heating valve sequences for additional sequences associated with pressurization.)
- 9. Smoke Exhaust Cycle: when exhaust is commanded by the interface to the fire alarm system, return fan shall start and shall exhaust 100% return air from the space. Supply fan shall remain off. (See damper and heating valve sequences for additional sequences associated with pressurization.)
- 10. Freeze Safety. Upon operation of a freezestat, unit shall be deenergized with the exception of the heating loops. Typically supply and return fans where applicable shall be deenergized via a hardwired interlock, , and an indication of the operation shall be sensed by the BAS. BAS shall enunciate appropriate alarm and remove and lock out the start command, which shall initiate "fan failure" alarms. OA dampers shall close and heating loops shall remain active.
- 11. Smoke Safety: Upon indication of smoke by a smoke detector, BAS shall deenergize the AH. Smoke detector shall notify the fire alarm system, shut down the fans, and close the smoke dampers via hard-wired interlock.
- 12. High or Low Pressure Safety: Upon activation of a high or low pressure safety switch, AH shall be deenergized, fans shall be deenergized via a hard wired interlock, and an indication of the operation shall be sensed by the BAS. BAS shall enunciate appropriate alarm and remove and lock out the start command, which shall initiate "fan failure" alarms.
- B. The detailed "logic strategies" above shall be required by reference in each of the individual sequences specified below.

3.04 <u>AIR HANDLING UNIT DIAGNOSTICS - GENERAL</u>

- A. Diagnostic Strategies: In addition to the standard alarm limits specified for all sensed variables the BAS monitor and diagnose anomalies in the operation of the air handlers. The following "diagnostic strategies" shall be included by reference with each air handler with any specific clarifications required:
 - Run Time Limit: BAS shall accumulate the runtime of the status of associated rotating equipment and enunciate a level 5 alarm to indicate that the unit is in need of service.
 - Constant Volume Filter Monitoring: BAS shall monitor the differential pressure switch across the filter bank(s). A level 5 alarm shall be reported when pressure drop exceeds the switch's setting.

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- 3. VAV Filter Monitoring: BAS shall monitor pressure drop across each air handling unit filter bank. A level 5 alarm shall be reported when pressure drop exceeds the calculated alarm limit. Pressure limit shall be recalculated as the (actual current flow/design flow)^1.5 times the design trip point. If the actual flow is not known, the output for the loop shall be used to determine the percent flow.
- 4. Start Monitoring: BAS shall accumulate the starts of cycling equipment. BAS shall further enunciate a level 5 alarm when the number of starts exceeds the specified value within the specified time period. (ie: more than 3 starts in a 30 min period)
- 5. Heating Valve Leak: While heating valve is closed, if the temperature increase across the heating coil exceeds 2°F continuously for 30 minutes; or if the discharge temperature is more than 5°F above setpoint for more than 30 minutes continuously, enunciate the following alarm at level 3 and 4 priority:
 - ENERGY WASTE: An unexpected temperature rise is occurring across the heating coil. Please check for leaking valve or faulty controls.
- 6. Cooling Valve Leak: While cooling valve is closed, if the temperature drop across the cooling coil exceeds 2°F continuously for 30 minutes; or if the discharge temperature is more than 5°F below setpoint for more than 30 minutes continuously, enunciate the following alarm at level 3 and 4 priority:
 - ENERGY WASTE: An unexpected temperature drop is occurring across the cooling coil. Please check for leaking valve or faulty controls.
- 7. Cooling Capacity Shortage: BAS shall monitor the output to the valve. If the output exceeds 99% open for 1 hour continuously, enunciate the following alarm
 - a) LACK OF CAPACITY: The cooling valve of XXX has been commanded to the full open position for an extended time period. Ensure that the setpoint for the control loop is at a reasonable value and that flow to the coil has not been obstructed as in a plugged s trainer, throttled balancing valve, debris in the control valve, etc.
- 8. Economizer Anomaly: If mixed air temperature is less than {low limit mixed air temperature}°F or greater than 85; or if the outside air temperature is between 55°F and 65°F and the mixed air temperature is more than 2°F different from the outside air temperature for more than 30 minutes continuously, enunciate the following alarm at level 3 and 4 priority:
 - ENERGY WASTE: An unexpected mixed air temperature indicates a possible problem with the economizer damper controls. Please check for faulty dampers or controls.
- Fighting Valves: BAS shall monitor the positions of the preheat and cooling coil valves and shall enunciate the following level 3 alarm if the valve positions are both over 10% open.
 - a) FIGHTING VALVES: The preheat and the cooling valves are opening simultaneously on XXX. Coordinate the control loops.
- 10. Fighting Thermal Zones: BAS shall monitor the mode of multiple terminal zones within a thermal zone and enunciate the following level 3 alarm if some are in heating mode, and others are in cooling mode:
 - FIGHTING TERMINAL UNITS: simultaneous heating and cooling exists in XXX. Coordinate the setpoints
- 11. Fighting Humidity Zones: BAS shall monitor the mode of multiple terminal zones within a humidity zone and enunciate the following level 3 alarm if some are in heating mode, and others are in cooling mode:
 - FIGHTING TERMINAL UNITS: simultaneous humidification and dehumidification exists in XXX. Coordinate the setpoints

3.05 <u>AIR HANDLER MONITORING AND MANAGEMENT</u>

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- A. General: The BAS shall monitor various aspects of the air handling systems and calculate parameters as specified below to facilitate operations and management.
 - B. System Condition Alarming: BAS shall monitor the following parameters and enunciate an alarm under any of the following conditions in addition to other monitor and alarm functions specified above
 - 1. Enunciate a Level 2 alarm when any active (air flowing) discharge temperature goes above or below its setpoint plus±8°F (adj.) for 15 min. continuously as follows:
 - Sensor XXX is indicating that the discharge temperature is outside of acceptable limits.
 - Enunciate a Level 2 alarm when any active (air flowing) heating duct or heating coil leaving temperature falls below its setpoint minus 8°F (adj.) for 15 min. continuously as follows:
 - Sensor XXX is indicating that the heating air temperature is below acceptable limits.
 - Enunciate a Level 2 alarm when any active (air flowing) cooling duct or cooling coil leaving temperature exceeds setpoint plus 8°F (adj.) for 5 min. continuously as follows:
 - Sensor XXX is indicating that the cooling air temperature is above acceptable limits.
 - 4. During the occupied period, enunciate a Level 2 alarm when any space temperature exceeds its active cooling setpoint plus 7°F (adj.) for 15 min. or falls below its active heating setpoint minus 7°F (adj.) for 15 min. continuously.
 - a) Zone XXX appears to be outside of acceptable limits.
 - C. Trending: The BAS shall continuously monitor, calculate and display the following parameters at the intervals indicated. These values shall be stored initially in the buffer of the controlling control unit, and then be uploaded periodically and stored on a specified hard disc. Contractor shall format this data to support one of the following data formats:
 - 1. Quote (text strings) and Comma delimited
 - Microsoft EXCEL
 - 3. Microsoft ACCESS
- D. Parameters to be trended:
 - 1. All temperature sensors at 1 hour intervals
 - 2. All relative humidity sensors at 1 hour intervals
 - 3. All run requests and statuses on a change in value
 - 4. All analog loop outputs on 1 hour intervals
 - Calculated enthalpies in 2 hour intervals
 - Summed cooling and heating requests on 2 hour intervals

39 3.06 ERU-1 THRU 7 AND 13 THRU 16 CONTROL

- 40 A. General: The custom packaged air handler shall be fully controlled by factory mounted
 41 controls. Unit shall be enabled and monitored by the BAS. For details on the referenced
 42 logic strategies refer to item 3.03 Air Handling Units General on page 15958 5. Air
 43 handler control logic strategies shall include
 - scheduled occupancy with optimum preoccupancy
- 45 2. smoke Safety
- B. Fans: Upon a signal from the BAS factory supplied controls shall control the starting and stopping of the supply fan as follows:

1 2 3 4 5 6 7			 2. 	Start/Stop: Factory supplied controls shall command the operation of the supply fan and it shall run continuously whenever the AH is "energized" as specified for the applicable logic strategies specified in item Air Handlers General on page 15958 - 5 above. Fan start command shall be withheld until the limit switches indicate the OA dampers are open and 2-way valve to the units heat exchanger is proved open. Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.
8 9		C.		EA Dampers: Factory supplied controls shall open the dampers whenever the unit is rgized and close them when it is deenergized.
10		D.	Disc	charge Temperature Control: The discharge temperature setpoints shall be as follows:
11			1.	Heating discharge setpoint: 75°F (adj.)
12 13			2.	DX Cooling Coil Leaving Temperature Setpoint: factory supplied controls shall set the cooling coil leaving temperature setpoint to to 55°F.
14		E.	Hea	at Recovery Section:
15 16			1.	BAS shall monitor entering and leaving temperatures on both the intake and exhaust sides of the heat wheel, air-to-air heat exchanger.
17		F.	Coo	ling Section:
18 19 20 21 22 23 24 25 26			1.	DX Cooling: Factory supplied controls shall enable, disable, and monitor the status of the DX equipment serving the coil. DX unit shall start, stop, and protect the compressors via Factory mounted controls. Refer to the specification on the respective unit for the unit mounted controls. Factory supplied controls shall be provided with enable/disable logic and shall include minimum off timers and minimum run timers. Unit shall control the output of the DX system by outputting a DA PID loop maintaining cooling discharge temperature setpoint through a step control logic function. During unoccupied period, if AH is energized for heating, warm-up, or night purge, the DX unit shall remain off.
27 28		G.		S shall prove the refrigerant circuit operation and monitor a common alarm signal from DX unit.
29		H.	Re-l	heating Section:
30 31			1.	Heat Pipe: Factory supplied controls shall maintain discharge air temperature setpoint of 75°F (adj.).
32 33		I.		gnostics: BAS execute the following diagnostic strategies as detailed in item 3.04 'Air adder Diagnostic Strategies' on page 15958-8
34			1.	Run-time Limit
35			2.	Start Monitoring
36			3.	CV Filter monitoring
37	3.07	AHU-8	CONT	<u>FROL</u>
38 39 40 41		A.	mou refe	neral: The split system single zone air handler shall be fully controlled by factory unted controls. Units shall be enabled and monitored by the BAS. For details on the renced logic strategies refer to item 3.03 Air Handling Units General on page 15958 - Air handler control logic strategies shall include
42 43 44 45			1. 2. 3. 4.	scheduled occupancy with optimum preoccupancy balanced position minimum outside air control mixed air low limit freeze Safety.
46		_	5.	smoke Safety
47 48		B.		ply and Return Fan: Upon a signal from the BAS, factory supplied controls shall trol the starting and stopping of the fans as follows:

1 2 3 4		 Start/Stop: Factory supplied controls shall command the operation of the fans and they shall run continuously whenever the AH is "energized" as specified for the applicable logic strategies specified in item Air Handlers General on page 15958 - 5 above.
5 6		Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.
7 8	C.	Return/Exhaust/OA Dampers: Factory supplied controls shall control the dampers as follows:
9 10 11		 Closed: When AH is deenergized, dampers shall remain in their "off" positions. When AH is energized during unoccupied period the minimum OA flow setpoint will be 0 cfm which will close the OA damper.
12 13 14		 Minimum OA Control: Factory supplied controls shall maintain the minimum OA using the balanced position strategy.
15 16 17 18 19 20 21 22 23 24	D.	Space Temperature Control: Control space temperature by resetting the discharge temperature on the AH. The space temperature setpoint shall be per the scheduled occupancy with optimum preoccupancy logic strategy. Three setpoints shall apply. Normal (72°F adj.)), setback heating (65°F (adj.)), and setback cooling (85°F). These three values shall be the only values changed by the operator to adjust space temperatures. All other deadbands, differentials, etc. shall be calculated in the program logic (unless another means is provided to prohibit overlap of the heating and cooling loops and ensure a dead band such as function block templates that restrict the setpoint input). During the normal periods, separate heating and cooling setpoints shall be calculated.
25		1. Normal space cooling setpoint: shall be the normal space temperature plus 2°F (adj.)
26		2. Normal space heating setpoint: shall be the normal space temperature minus 2°F
27 28		(adj.) 3. When fan is cycled on during the unoccupied period to maintain setback space
29 30		 When fan is cycled on during the unoccupied period to maintain setback space temperatures, the temperature control loops shall be enabled with normal setpoints.
31 32 33 34	E.	Discharge Temperature Control: The discharge temperature setpoint shall be reset from the space temperature by two reverse acting PID algorithms outputting a temperature ranges, one for heating and one for cooling as follows (PID output can be rescaled if necessary):
35 36		 Heating discharge setpoint: 50°F to 90°F (or the heating design temperature) both adjustable.
37 38 39		 Cooling discharge setpoint: 55°F (or the cooling design temperature) to 75°F both adjustable.
40	F.	Heat Recovery Section:
41 42		 BAS shall monitor entering and leaving temperatures on both the intake and exhaust sides of the heat wheel, air-to-air heat exchanger.
43	G.	Heating Section:
44 45 46 47 48		1. HW Heating Valve and Coil Pump: Whenever AH is energized, N.O. valve shall modulate per the higher of 1) a DA PID loop to maintain a leaving temperature of the discharge air temperature setpoint minus 5°F and 2) a proportional only loop maintaining a low limit of 45°F mixed air temperature. BAS shall cycle the pump on below and off above 55°F (with 5°F cycle differential).
49	H.	Cooling Section:
50 51 52 53 54		1. DX Cooling: Factory supplied controls shall enable, disable, and monitor the status of the DX equipment serving the coil. DX unit shall start, stop, and protect the compressors via Factory mounted controls. Refer to the specification on the respective unit for the unit mounted controls. Factory supplied controls shall be provided with enable/disable logic and shall include minimum off timers and

1 2 3 4			minimum run timers. Unit shall control the output of the DX system by outputting a DA PID loop maintaining cooling discharge temperature setpoint through a step control logic function. During unoccupied period, if AH is energized for heating, warm-up, or night purge, the DX unit shall remain off.
5 6 7			2. BAS shall prove the refrigerant circuit operation and monitor a common alarm signal from the DX unit.
8		I.	Diagnostics: BAS execute the following diagnostic strategies as detailed in item 3.04 'Air Handler Diagnostic Strategies' on page 15958-8
10			1. Run-time Limit
11			2. Start Monitoring
12			3. CV Filter monitoring
13			4. Heating Valve Leak
14	3.08	AHU-9	ND 10 CONTROL
15 16 17 18		A.	General: The split system single zone air handler shall be fully controlled by factory mounted controls. Units shall be enabled and monitored by the BAS. For details on the referenced logic strategies refer to item 3.03 Air Handling Units General on page 15958 - 5. Air handler control logic strategies shall include
19			scheduled occupancy with optimum preoccupancy
20			2. balanced position minimum outside air control
21			3. mixed air low limit
22			4. freeze Safety.
23			5. smoke Safety
24 25		B.	Supply and Return Fan: Upon a signal from the BAS, factory supplied controls shall control the starting and stopping of the fans as follows:
26 27 28 29			1. Start/Stop: Factory supplied controls shall command the operation of the fans and it they shall run continuously whenever the AH is "energized" as specified for the applicable logic strategies specified in item Air Handlers General on page 15958 - 5 above.
30 31			2. Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.
32 33		C.	Return/Exhaust/OA Dampers: Factory supplied controls shall control the dampers as follows:
34 35 36			 Closed: When AH is deenergized, dampers shall remain in their "off" positions. When AH is energized during unoccupied period the minimum OA flow setpoint will be 0 cfm which will close the OA damper.
37 38 39			2. Minim um OA Control: Factory supplied controls shall maintain the minimum OA using the balanced position strategy.
40 41 42 43 44 45 46 47 48 49		D.	Space Temperature Control: Control space temperature by resetting the discharge temperature on the AH. The space temperature setpoint shall be per the scheduled occupancy with optimum preoccupancy logic strategy. Three setpoints shall apply. Normal (72°F adj.)), setback heating (65°F (adj.)), and setback cooling (85°F). These three values shall be the only values changed by the operator to adjust space temperatures. All other deadbands, differentials, etc. shall be calculated in the program logic (unless another means is provided to prohibit overlap of the heating and cooling loops and ensure a dead band such as function block templates that restrict the setpoint input). During the normal periods, separate heating and cooling setpoints shall be calculated.
50			1. Normal space cooling setpoint: shall be the normal space temperature plus 2°F (adj.)
51 52			 Normal space heating setpoint: shall be the normal space temperature minus 2°F (adj.)

1 When fan is cycled on during the unoccupied period to maintain setback space 2 temperatures, the temperature control loops shall be enabled with normal setpoints. 3 E. Discharge Temperature Control: The discharge temperature setpoint shall be reset from 4 the space temperature by two reverse acting PID algorithms outputting a temperature ranges, one for heating and one for cooling as follows (PID output can be rescaled if 5 6 necessary):. 7 Heating discharge setpoint: 50°F to 90°F (or the heating design temperature) both 8 adjustable. 9 2. Cooling discharge setpoint: 55°F (or the cooling design temperature) to 75°F both 10 adjustable. 11 F. Heat Recovery Section: 12 BAS shall monitor entering and leaving temperatures on both the intake and exhaust 13 sides of the flat plate, air-to-air heat exchanger. 14 G. Heating Section: 15 HW Heating Valve and Coil Pump: Whenever AH is energized, N.O. valve shall modulate per the higher of 1) a DA PID loop to maintain a leaving temperature of the 16 discharge air temperature setpoint minus 5°F and 2) a proportional only loop 17 maintaining a low limit of 45°F mixed air temperature. BAS shall cycle the pump on 18 19 below and off above 55°F (with 5°F cycle differential). 20 H. Cooling Section: 21 DX Cooling: Factory supplied controls shall enable, disable, and monitor the status 22 of the DX equipment serving the coil. DX unit shall start, stop, and protect the 23 compressors via Factory mounted controls. Refer to the specification on the 24 respective unit for the unit mounted controls. Factory supplied controls shall be provided with enable/disable logic and shall include minimum off timers and 25 26 minimum run timers. Unit shall control the output of the DX system by outputting a 27 DA PID loop maintaining cooling discharge temperature setpoint through a step 28 control logic function. During unoccupied period, if AH is energized for heating. 29 warm-up, or night purge, the DX unit shall remain off. 30 BAS shall prove the refrigerant circuit operation and monitor a common alarm signal 2. 31 from the DX unit. 32 33 I. Diagnostics: BAS execute the following diagnostic strategies as detailed in item 3.04 'Air 34 Handler Diagnostic Strategies' on page 15958-8 35 1. Run-time Limit 36 2. Start Monitoring 37 3. CV Filter monitoring 38 4. Heating Valve Leak 39 3.09 AHU-11 AND 12 CONTROL 40 A. General: The packaged single zone air handler shall be fully controlled by factory mounted 41 controls. Units shall be enabled and monitored by the BAS. For details on the referenced 42 logic strategies refer to item 3.03 Air Handling Units General on page 15958 - 5. Air 43 handler control logic strategies shall include 44 scheduled occupancy with optimum preoccupancy 45 2. balanced position minimum outside air control 46 3. mixed air low limit 47 4. freeze Safety. 48 5. smoke Safety 49 В. Supply and Return Fan: Upon a signal from the BAS, factory supplied controls shall 50 control the starting and stopping of the fans as follows:

_	2. Proof: BAS shall prove fan operation and use the status indication to accumulate	
5 6	runtime.	
7 8	Return/Exhaust/OA Dampers: Fcatory supplied controls shall control the dampers as follows:	
9 10 11	 Closed: When AH is deenergized, dampers shall remain in their "off" positions. When AH is energized during unoccupied period the minimum OA flow setpoint will be 0 cfm which will close the OA damper. 	
12 13 14	 Minimum OA Control: Factory supplied controls shall maintain the minimum OA using the balanced position strategy. 	
15 D. 16 17 18 19 20 21 22 23 24	Space Temperature Control: Control space temperature by resetting the discharge temperature on the AH. The space temperature setpoint shall be per the scheduled occupancy with optimum preoccupancy logic strategy. Three setpoints shall apply. Normal (72°F adj.)), setback heating (65°F (adj.)), and setback cooling (85°F). These three values shall be the only values changed by the operator to adjust space temperatures. All other deadbands, differentials, etc. shall be calculated in the program logic (unless another means is provided to prohibit overlap of the heating and cooling loops and ensure a dead band such as function block templates that restrict the setpoint input). During the normal periods, separate heating and cooling setpoints shall be calculated.	
25	1. Normal space cooling setpoint: shall be the normal space temperature plus 2°F (adj.	
26 27 28	 Normal space heating setpoint: shall be the normal space temperature minus 2°F (adj.) When fan is cycled on during the unoccupied period to maintain setback space 	
29	temperatures, the temperature control loops shall be enabled with normal setpoints.	
30 E. 31 32 33	Discharge Temperature Control: The discharge temperature setpoint shall be reset from the space temperature by two reverse acting PID algorithms outputting a temperature ranges, one for heating and one for cooling as follows (PID output can be rescaled if necessary):.	
34 35	 Heating discharge setpoint: 50°F to 90°F (or the heating design temperature) both adjustable. 	
36 37	 Cooling discharge setpoint: 55°F (or the cooling design temperature) to 75°F both adjustable. 	
38 F.	Heat Recovery Section:	
39 40	 BAS shall monitor entering and leaving temperatures on both the intake and exhaust sides of the flat plate, air-to-air heat exchanger. 	
41 G.	Heating Section:	
42 43 44 45 46	1. HW Heating Valve and Coil Pump: Whenever AH is energized, N.O. valve shall modulate per the higher of 1) a DA PID loop to maintain a leaving temperature of the discharge air temperature setpoint minus 5°F and 2) a proportional only loop maintaining a low limit of 45°F mixed air temperature. BAS shall cycle the pump on below and off above 55°F (with 5°F cycle differential).	
47 H.	Cooling Section:	
48 49 50 51 52 53 54	DX Cooling: Factory supplied controls shall enable, disable, and monitor the status of the DX equipment serving the coil. DX unit shall start, stop, and protect the compressors via Factory mounted controls. Refer to the specification on the respective unit for the unit mounted controls. Factory supplied controls shall be provided with enable/disable logic and shall include minimum off timers and minimum run timers. Unit shall control the output of the DX system by outputting a DA PID loop maintaining cooling discharge temperature setpoint through a step	

2			control logic function. During unoccupied period, if AH is energized for heating, warm-up, or night purge, the DX unit shall remain off.			
3 4 5			2. BAS shall prove the refrigerant circuit operation and monitor a common alarm signal from the DX unit. Output Description:			
6 7		I.	Diagnostics: BAS execute the following diagnostic strategies as detailed in item 3.04 'Air Handler Diagnostic Strategies' on page 15958-8			
8			1. Run-time Limit			
9			2. Start Monitoring			
10			3. CV Filter monitoring			
11			4. Heating Valve Leak			
12	3.10	<u>AHU-18</u>	8 CONTROL			
13 14 15		A.	General: The make up air handler shall be fully controlled by the BAS. For details on the referenced logic strategies refer to item 3.03 Air Handling Units General on page 15958 - 5. Air handler control logic strategies shall include			
16			1. freeze Safety.			
17			2. smoke Safety			
18		B.	Supply Fan: BAS shall control the starting and stopping of the supply fan as follows:			
19 20 21 22 23			 Start/Stop: BAS shall command the operation of the supply fan and it shall run continuously whenever the AH is "energized" as specified for the applicable logic strategies specified in item Air Handlers General on page 15958 - 5 above. Fan start command shall be withheld until the limit switches indicate the OA dampers are open. 			
24 25			Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.			
26 27		C.	Kitchen Exhaust Fan (GEF-1): BAS shall control the starting and stopping of the fan as follows:			
28 29 30			 Start/Stop: BAS shall command the operation of the Exhaust fan and it shall run continuously whenever started by local ON/OFF switch. When Kitchen exhaust fan is energized Makeup air unit AHU-18 is also energized and run continuously. 			
31 32		D.	OA Dampers: BAS shall open the dampers whenever the unit is energized and close them when it is deenergized.			
33		E.	Discharge Temperature Control: The discharge temperature setpoints shall be as follows:			
34			1. Heating discharge setpoint: 69°F (adj.)			
35			2. Cooling Coil Leaving Temperature Setpoint: BAS shall reset the cooling coil leaving			
36 37			temperature based on space humidity. Setpoint shall be reset based on a RA PID loop outputting a setpoint of 69°F to 55°F.			
38		F.	Preheating Section:			
39			HW Heating Valve and Coil Pump: Whenever AH is energized, N.O. valve shall			
40			modulate per the higher of 1) a DA PID loop to maintain a leaving temperature of the			
41			discharge air temperature setpoint minus 5°F and 2) a proportional only loop			
42 43			maintaining a low limit of 45°F leaving the coil. BAS shall cycle the pump on below and off above 55°F (adj.) (with 5°F cycle differential).			
+3 44		G.	Cooling Section:			
45		0.	DX Cooling: BAS shall enable, disable, and monitor the status of the DX equipment			
46			serving the coil. DX unit shall start, stop, and protect the compressors via unit			
1 7			mounted controls. Refer to the specification on the respective unit for the unit			
48 40			mounted controls. Factory supplied controls shall be provided with enable/disable			
49 50			logic and shall include minimum off timers and minimum run timers. Unit shall control the output of the DX system by outputting a DA PID loop maintaining cooling			

1 2 3			discharge temperature setpoint through a step control logic function. During unoccupied period, if AH is energized for heating, warm -up, or night purge, the DX unit shall remain off.
4 5			2. BAS shall prove the refrigerant circuit operation and monitor a common alarm signal from the DX unit.
6 7		H.	Diagnostics: BAS execute the following diagnostic strategies as detailed in item 3.04 'Air Handler Diagnostic Strategies' on page 15958-8
8			1. Run-time Limit
9			2. Start Monitoring
10			3. CV Filter monitoring
11			4. Heating Valve Leak
12			5. Cooling Valve Leak
13			6. Cooling Capacity Shortage
14			7. Fighting Valves
15	3.11	<u>AHU-19</u>	CONTROL
16 17 18 19		A.	General: The split system VAV air handler shall be fully controlled by factory mounted controls. Units shall be enabled and monitored by the BAS. For details on the referenced logic strategies refer to item 3.03 Air Handling Units General on page 15958 - 5. Air handler control logic strategies shall include
20			1. scheduled occupancy with optimum preoccupancy
21			2. balanced position minimum outside air control
22			3. mixed air low limit
23			4. freeze Safety.
24			5. smoke Safety
25 26			6. pressure Safety
27 28		B.	Supply and Return Fan: Upon a signal from the BAS, factory supplied controls shall control the starting and stopping of the fans as follows:
29 30 31 32			 Start/Stop: Factory supplied controls shall command the operation of the fans and it they shall run continuously whenever the AH is "energized" as specified for the applicable logic strategies specified in item Air Handlers General on page 15958 - 5 above.
33 34			2. Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.
35 36 37 38 39			3. VSD Control: Whenever the fan is energized, factory supplied controls shall control the speed of the VSD to maintain the supply duct static pressure setpoint. On start and stop, the VSD shall ramp to speed and slow down within adjustable acceleration and deceleration limits. BAS shall monitor a common alarm output from the drive and enunciate a level 2 alarm when an alarm is indicated.
40			4. Supply Duct Pressure Setpoint: Setpoint shall be:
41 42			 Reset between the limits of .5" to 2" as to maintain cooling requests of the VAV boxes at 4 with all values adjustable.
43 44			5. Capacity Control: Factory supplied controls shall control the output of the return fan VSD per the following logic strategy:
45			a) Flow Tracking with: Fixed Differential.
46 47		C.	Return/Exhaust/OA Dampers: Factory supplied controls shall control the dampers as follows:
48 49 50			 Closed: When AH is deenergized, dampers shall remain in their "off" positions. When AH is energized during unoccupied period the minimum OA flow setpoint will be 0 cfm which will close the OA damper.

1 Minimum OA Control: Factory supplied controls shall maintain the minimum OA using 2 the reset balanced position strategy. 3 D. Space Temperature Control: The space temperatures shall be controlled via individual 4 VAV boxes. The setback setpoint for cycling the unit shall be 60°F (adj.) for heating and 85°F (adj.) for cooling. Ensure that these setpoints are outside the control range of all box 5 6 control loops. 7 E. Discharge Temperature Control: The discharge temperature setpoint shall be controlled 8 9 During the occupied period, the discharge temperature shall be reset from 55°F to 65°F as the outside air temperature falls from 55°F to 25°F with all values being 10 11 adiustable. During the occupied period, the discharge temperature shall be reset from 55°F to 12 2. 13 65°F as the supply fan variable speed drive output falls from 60% to 40% 14 When the unit is energized for setback heating during the unoccupied period, the 15 discharge temperature setpoint shall be 75°F (adj.) F. 16 Preheating Section: 17 HW Heating Valve and Coil Pump: Whenever AH is energized, N.O. valve shall 18 modulate per the higher of 1) a DA PID loop to maintain a leaving temperature of the discharge air temperature setpoint minus 5°F and 2) a proportional only loop 19 maintaining a low limit of 45°F leaving the coilmixed air temperature. BAS shall 20 21 cycle the pump on below and off above 55°F (with 5°F cycle differential). 22 G. Cooling Section: 23 DX Cooling: Factory supplied controls shall enable, disable, and monitor the status 24 of the DX equipment serving the coil. DX unit shall start, stop, and protect the 25 compressors via Factory mounted controls. Refer to the specification on the 26 respective unit for the unit mounted controls. Factory supplied controls shall be 27 provided with enable/disable logic and shall include minimum off timers and 28 minimum run timers. Unit shall control the output of the DX system by outputting a 29 DA PID loop maintaining cooling discharge temperature setpoint through a step control logic function. During unoccupied period, if AH is energized for heating, 30 31 warm-up, or night purge, the DX unit shall remain off. 32 BAS shall prove the refrigerant circuit operation and monitor a common alarm signal 33 from the DX unit. 34 H. Diagnostics: BAS execute the following diagnostic strategies as detailed in item 3.04 'Air 35 Handler Diagnostic Strategies' on page 15958 8-36 1. Run-time Limit 37 2. Start Monitoring 38 3. CV Filter monitoring 39 4. Heating Valve Leak 3.12 40 AHU-17 AND 20 CONTROL 41 General: The packaged single zone air handler shall be fully controlled by factory mounted Α. 42 controls. Units shall be enabled and monitored by the BAS. For details on the referenced 43 logic strategies refer to item 3.03 Air Handling Units General on page 15958 - 5. Air 44 handler control logic strategies shall include 45 scheduled occupancy with optimum preoccupancy 46 2. balanced position minimum outside air control 47 3. mixed air low limit 48 freeze Safety. 49 В. Supply and Return Fan: Upon a signal from the BAS, factory supplied controls shall 50 control the starting and stopping of the fans as follows:

1 2 3 4		 Start/Stop: Factory supplied controls shall command the operation of the fans and it they shall run continuously whenever the AH is "energized" as specified for the applicable logic strategies specified in item Air Handlers General on page 15958 - 5 above. 		
5 6		Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.		
7 8	C.	Return/Exhaust/OA Dampers: Fcatory supplied controls shall control the dampers as follows:		
9 10 11		 Closed: When AH is deenergized, dampers shall remain in their "off" positions. When AH is energized during unoccupied period the minimum OA flow setpoint will be 0 cfm which will close the OA damper. 		
12 13 14		2. Minimum OA Control: Factory supplied controls shall maintain the minimum OA using the balanced position strategy.		
15 16 17 18 19 20 21 22 23 24	D.	Space Temperature Control: Control space temperature by resetting the discharge temperature on the AH. The space temperature setpoint shall be per the scheduled occupancy with optimum preoccupancy logic strategy. Three setpoints shall apply. Normal (72°F adj.)), setback heating (65°F (adj.)), and setback cooling (85°F). These three values shall be the only values changed by the operator to adjust space temperatures. All other deadbands, differentials, etc. shall be calculated in the program logic (unless another means is provided to prohibit overlap of the heating and cooling loops and ensure a dead band such as function block templates that restrict the setpoint input). During the normal periods, separate heating and cooling setpoints shall be calculated.		
25		1. Normal space cooling setpoint: shall be the normal space temperature plus 2°F (adj.)		
26 27		2. Normal space heating setpoint: shall be the normal space temperature minus 2°F (adj.)		
28 29		 When fan is cycled on during the unoccupied period to maintain setback space temperatures, the temperature control loops shall be enabled with normal setpoints. 		
30 31 32 33	E.	Discharge Temperature Control: The discharge temperature setpoint shall be reset from the space temperature by two reverse acting PID algorithms outputting a temperature ranges, one for heating and one for cooling as follows (PID output can be rescaled if necessary):.		
34 35		1. Heating discharge setpoint: 50°F to 90°F (or the heating design temperature) both adjustable.		
36 37		 Cooling discharge setpoint: 55°F (or the cooling design temperature) to 75°F both adjustable. 		
38	F.	Heat Recovery Section:		
39 40		1. BAS shall monitor entering and leaving temperatures on both the intake and exhaust sides of the flat plate, air-to-air heat exchanger.		
41	G.	Heating Section:		
42 43 44 45 46		1. HW Heating Valve and Coil Pump: Whenever AH is energized, N.O. valve shall modulate per the higher of 1) a DA PID loop to maintain a leaving temperature of the discharge air temperature setpoint minus 5°F and 2) a proportional only loop maintaining a low limit of 45°F mixed air temperature. BAS shall cycle the pump on below and off above 55°F (with 5°F cycle differential).		
47	H.	Cooling Section:		
48 49 50 51 52 53		1. DX Cooling: Factory supplied controls shall enable, disable, and monitor the status of the DX equipment serving the coil. DX unit shall start, stop, and protect the compressors via Factory mounted controls. Refer to the specification on the respective unit for the unit mounted controls. Factory supplied controls shall be provided with enable/disable logic and shall include minimum off timers and minimum run timers. Unit shall control the output of the DX system by outputting a		
54		DA PID loop maintaining cooling discharge temperature setpoint through a step		

1 2			control logic function. During unoccupied period, if AH is energized for heating, warm-up, or night purge, the DX unit shall remain off.		
3 4 5			 BAS shall prove the refrigerant circuit operation and monitor a common alarm signal from the DX unit. 		
6 7		I.	Diagnostics: BAS execute the following diagnostic strategies as detailed in item 3.04 'Air Handler Diagnostic Strategies' on page 15958-8		
8			1. Run-time Limit		
9			2. Start Monitoring		
10			3. CV Filter monitoring		
11			4. Heating Valve Leak		
12	3.13	AHU-2	21 CONTROL		
13 14 15 16		A.	General: The packaged single zone air handler shall be fully controlled by factory mounted controls. Units shall be enabled and monitored by the BAS. For details on the referenced logic strategies refer to item 3.03 Air Handling Units General on page 15958 - 5. Air handler control logic strategies shall include		
17			1. scheduled occupancy with optimum preoccupancy		
18			2. balanced position minimum outside air control		
19			3. mixed air low limit		
20			4. freeze Safety.		
21 22		B.	Supply Fan: Upon a signal from the BAS, factory supplied controls shall control the starting and stopping of the fans as follows:		
23 24 25			 Start/Stop: Factory supplied controls shall command the operation of the fan and it shall run continuously whenever the AH is "energized" as specified for the applicable logic strategies specified in item Air Handlers General on page 15958 - 5 above. 		
26 27			Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.		
28 29		C.	Return/Exhaust/OA Dampers: Factory supplied controls shall control the dampers as follows:		
30 31 32			 Closed: When AH is deenergized, dampers shall remain in their "off" positions. When AH is energized during unoccupied period the minimum OA flow setpoint will be 0 cfm which will close the OA damper. 		
33 34 35			 Minimum OA Control: Factory supplied controls shall maintain the minimum OA using the balanced position strategy. 		
36 37 38 39 40 41 42 43 44 45		D.	Space Temperature Control: Control space temperature by resetting the discharge temperature on the AH. The space temperature setpoint shall be per the scheduled occupancy with optimum preoccupancy logic strategy. Three setpoints shall apply. Normal (72°F adj.)), setback heating (65°F (adj.)), and setback cooling (85°F). These three values shall be the only values changed by the operator to adjust space temperatures. All other deadbands, differentials, etc. shall be calculated in the program logic (unless another means is provided to prohibit overlap of the heating and cooling loops and ensure a dead band such as function block templates that restrict the setpoint input). During the normal periods, separate heating and cooling setpoints shall be calculated.		
46 47			 Normal space cooling setpoint: shall be the normal space temperature plus 2°F (adj.) Normal space heating setpoint: shall be the normal space temperature minus 2°F 		
48 49 50			(adj.)When fan is cycled on during the unoccupied period to maintain setback space temperatures, the temperature control loops shall be enabled with normal setpoints.		

1 2 3 4		E.	Discharge Temperature Control: The discharge temperature setpoint shall be reset from the space temperature by two reverse acting PID algorithms outputting a temperature ranges, one for heating and one for cooling as follows (PID output can be rescaled if necessary):.	
5 6			1.	Heating discharge setpoint: 50°F to 90°F (or the heating design temperature) both adjustable.
7 8			2.	Cooling discharge setpoint: 55°F (or the cooling design temperature) to 75°F both adjustable.
9		F.	Heating Section:	
10 11 12 13 14			1.	HW Heating Valve and Coil Pump: Whenever AH is energized, N.O. valve shall modulate per the higher of 1) a DA PID loop to maintain a leaving temperature of the discharge air temperature setpoint minus 5°F and 2) a proportional only loop maintaining a low limit of 45°F mixed air temperature. BAS shall cycle the pump on below and off above 55°F (with 5°F cycle differential).
15		G.	Coo	ling Section:
16 17 18 19 20 21 22 23 24			1.	DX Cooling: Factory supplied controls shall enable, disable, and monitor the status of the DX equipment serving the coil. DX unit shall start, stop, and protect the compressors via Factory mounted controls. Refer to the specification on the respective unit for the unit mounted controls. Factory supplied controls shall be provided with enable/disable logic and shall include minimum off timers and minimum run timers. Unit shall control the output of the DX system by outputting a DA PID loop maintaining cooling discharge temperature setpoint through a step control logic function. During unoccupied period, if AH is energized for heating, warm-up, or night purge, the DX unit shall remain off.
25 26 27			2.	BAS shall prove the refrigerant circuit operation and monitor a common alarm signal from the DX unit.
28 29		H.	Diagnostics: BAS execute the following diagnostic strategies as detailed in item 3.04 Handler Diagnostic Strategies' on page 15958-8	
30			1.	Run-time Limit
31			2.	Start Monitoring
32			3.	CV Filter monitoring
33			4.	Heating Valve Leak
34	3.14	TYPICAL WATER SOURCE HEAT PUMP CONTROL		
35 36 37 38 39 40			1.	General: The packaged single zone heat pumps shall be fully controlled by factory mounted controls. Units start stop shall be enabled by space occupancy sensor associated with each WSHP. In addition, the occupancy sensor shall be interlocked with zone lighting control. Lighting control shall be dependent on occupancy only and not on unit on/off status. The unit shall be monitored by the BAS. The BAS shall be able to override the space occupancy sensor control.
41 42		B.		ply Fan: Upon a signal from the occupancy sensor or the BAS, factory supplied trols shall control the starting and stopping of the supply fan as follows:
43 44 45 46 47			1.	Start/Stop: Factory supplied controls shall command the operation of the fan and it shall run continuously whenever the AH is "energized" as specified for the applicable logic strategies specified in item Air Handlers General on page 15958 - 5 above. Fan start command shall be withheld until 2-way valve to the units heat exchanger is proved open.
48			2.	Proof: BAS shall prove fan operation and use the status indication to accumulate

runtime.

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- C. Space Temperature Control: Control of space temperature by cycling of the WSHP units compressor. The space temperature setpoint shall be per the scheduled occupancy with optimum preoccupancy logic strategy. Three setpoints shall apply. Normal (72°F adj.)), setback heating (65°F (adj.)), and setback cooling (85°F). These three values shall be the only values changed by the operator to adjust space temperatures. All other deadbands, differentials, etc. shall be calculated in the program logic (unless another means is provided to prohibit overlap of the heating and cooling loops and ensure a dead band such as function block templates that restrict the setpoint input). During the normal periods, separate heating and cooling setpoints shall be calculated.
 - 1. Normal space cooling setpoint: shall be the normal space temperature plus 2°F (adj.)
 - Normal space heating setpoint: shall be the normal space temperature minus 2°F (adj.)
 - 3. When fan is cycled on during the unoccupied period to maintain setback space temperatures, the temperature control loops shall be enabled with normal setpoints.

D. Heating Coil:

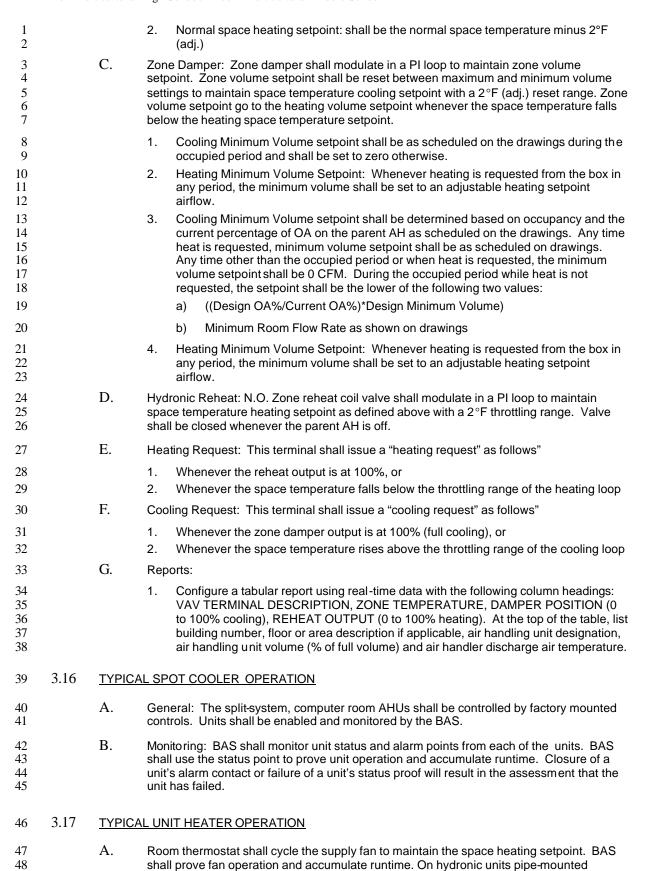
 Electric Coil: On compressor failure during a call for heating, supplemental heating coils shall be energized to maintain space thermostat setpoint. Supplemental heating coil shall be locked out at all other times

E. Cooling Section:

- 1. DX Cooling: Factory supplied controls shall enable, disable, and monitor the status of the DX equipment serving the coil. DX unit shall start, stop, and protect the compressors via Factory mounted controls. Refer to the specification on the respective unit for the unit mounted controls. Factory supplied controls shall be provided with enable/disable logic and shall include minimum off timers and minimum run timers. Unit shall control the output of the DX system by outputting a DA PID loop maintaining cooling discharge temperature setpoint through a step control logic function. During unoccupied period, if AH is energized for heating, warm-up, or night purge, the DX unit shall remain off.
- 2. BAS shall prove the refrigerant circuit operation and monitor a common alarm signal from the DX unit.
- F. Diagnostics: BAS execute the following diagnostic strategies as detailed in item 3.04 'Air Handler Diagnostic Strategies' on page 15958-8
 - 1. Run-time Limit
 - 2. Start Monitoring
 - 3. CV Filter monitoring

3.15 SINGLE DUCT VAV BOX WITH REHEAT CONTROL

- A. General: Control shall be pressure independent with minimum and maximum flow setpoints, scheduled occupancy with optimimum preoccupancy. Schedule shall be the same as the parent AH.
- B. Space Temperature Control: Three setpoints shall apply. Normal (72°F adj.)), setback heating (65°F (adj.)), and setback cooling (85°F). These three values shall be the only values changed by the operator to adjust space temperatures. All other deadbands, differentials, etc. shall be calculated in the program logic (unless another means is provided to prohibit overlap of the heating and cooling loops and ensure a dead band such as function block templates that restrict the setpoint input). During the normal periods, separate heating and cooling setpoints shall be calculated.
 - 1. Normal space cooling setpoint: shall be the normal space temperature plus 2°F (adj.)
 - a) During night purge cycle, the normal space cooling setpoint shall be 71°F.



thermostat stops fan when return heating-water space temperature falls below set point.

1 3.18 TYPICAL CABINET UNIT HEATER OPERATION

A. Room thermostat shall cycle the supply fan to maintain the space heating setpoint. BAS shall prove fan operation and accumulate runtime. On hydronic units pipe-mounted thermostat stops fan when return heating-water space temperature falls below set point.

5 3.19 TYPICAL RADIATOR/CONVECTOR OPERATION

A. Room thermostat shall sequences the stages of heating to maintain the space heating setpoint. BAS shall monitor the units operation. On hydronic units pipe-room thermostat shall modulate control valve to maintain the space heating setpoint.

9 3.20 GARAGE VENTILATION

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- A. GEF-39 General: BAS shall control the starting and stopping of the exhaust fan as follows:
 - Start/Stop: BAS shall command the operation of the exhaust fan and it shall run continuously whenever CO levels at the sensor are above setpoint.
 - 2. Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.
 - 3. Dampers: BAS shall open associated OA intake damper and exhaust air damper whenever fan is energized.

18 3.21 TYPICAL KILN HOOD EXHAUST OPERATION

- A. General: BAS shall control the starting and stopping of the fan as follows:
- 20 1. Start/Stop: BAS shall command the operation of the Exhaust fan and it shall run continuously whenever started by local ON/OFF switch.
- B. Dampers: BAS shall open associated exhaust air damper whenever the unit is energized and do the reverse when it is deenergized.

24 3.22 TYPICAL FUME HOOD, SCIENCE ROOM EXHAUST

- 25 A. General: BAS shall control the starting and stopping of the fan as follows:
 - 1. Start/Stop: BAS shall command the operation of the Exhaust fan and it shall run continuously whenever started by local ON/OFF switch.
 - B. Dampers: BAS shall open associated exhaust air damper and close associated zone damper whenever the unit is energized and do the reverse when it is deenergized. Zone damper shall be interlocked with associated ERU, VSD.
- C. VSD Control: Whenever the exhaust fan is energized and zone damper is proved closed, ERU factory supplied controls shall control the speed of the associated ERU units return fan VSD through a frequency setting to maintain normal return air quantities minus exhaust air quantities. On start and stop, the VSD shall ramp to speed and slow down within adjustable acceleration and deceleration limits. BAS shall monitor a common alarm output from the drive and enunciate a level 2 alarm when an alarm is indicated.

37 3.23 TYPICAL ELECTRICAL/MECHANICAL/PUMP ROOM VENTILATION

- A. General: BAS shall control the starting and stopping of the exhaust fan as follows:
 - 1. Start/Stop: BAS shall command the operation of the exhaust fan and it shall run continuously whenever the room space temperature rises above a setpoint of 80°F.
 - 2. Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.

1 2			3.	Dampers: BAS shall open associated OA and EA dampers whenever fan is energized.				
3	3.24	TYPICA	ICAL LAUNDRY ROOM EXHAUST					
4		A.	General: BAS shall control the starting and stopping of the exhaust fan as follows:					
5 6			1.	Start/Stop: BAS shall command the operation of the exhaust fan and it shall run continuously whenever the laundry room space temperature rises above a setpoint				
7			_	of 80°F or associated dryer is indexed to on.				
8 9			2.	Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.				
10 11			3.	Damper: BAS shall open associated OA intake damper and close associated exhaust air damper whenever fan is energized.				
12	3.25	BOILER	ROC	DM VENTILATION				
13		A.	GEF	F-3 - General: BAS shall control the starting and stopping of the exhaust fan as follows:				
14 15			1.	Start/Stop: BAS shall command the operation of the exhaust fan and it shall run continuously whenever the room space temperature rises above a setpoint of 80°F.				
16 17			2.	Proof: BAS shall prove fan operation and use the status indication to accumulate runtime.				
18		B.	Dam	npers: BAS shall open associated OA and EA dampers whenever fan is energized.				
19	3.26	SUMP I	PUMP	P AND CONDENSATE PUMP MONITORING				
20		A.	BAS	S shall monitor the status of the sump and condensate pumps and accumulate runtime.				
21	3.27	HPW S	<u>YSTE</u>	<u>.M</u>				
22 23		A.		eral: BAS shall fully control the heat pump water system and equipment and provide itoring and diagnostic information for management purposes.				
24 25 26		B.	wate	t Pump Water Temperature Control: Temperature shall be maintained by by supply er temperature sensor controlling a 3-way valve to maintain individual loop setpoint aperature. Active HPW setpoint shall be adjustable through the BAS.				
27		C.	HPV	V Pump Control				
28 29 30 31 32 33			1.	HPW pumps shall be started to serve their respective heat pump loops when it is requested to run by the BAS. Pumps shall run continuously when started. BAS shall prove operation of the pump. BAS shall vary the speed of the pumps in unison to maintain the lowest differential pressure setpoint across any of the applicable differential pressure sensor(s). The differential pressure setpoint shall be 10 psi (adj.) or as optimized by the TAB contractor.				
34		D.	Con	denser Water Pump Control				
35 36			1.	Pumps shall be started per the HPW pump start and stop sequences Pumps shall run continuously when started. BAS shall prove operation of the pumps.				
37		E.	Cool	ling Tower Control				
38 39			1.	BAS shall enable cooling tower, per the HPW start and stop sequence. When enabled, the BAS shall control the fans as follows:				
40 41 42				a) BAS shall use a PID loop to maintain a leaving tower water temperature of 75°F. This PID loop shall be set up with functionally a 16°F throttling range and only a small/slow integral gain.				
43				b) BAS shall prove operation of each fan and accumulate runtime.				

F.

Cooling Tower Bypass Valve Control

1 2			1.		shall control the bypass valve via a PID control loop to maintain a minimum ed condenser water temperature of 65°F.
3		G.	HPV	V Syst	tem Start Sequence
4			1.	On a	a request for system loop HPW, the following sequence shall occur:
5				a)	Wait one minute (adj.).
6 7				b)	Enable cooling tower as specified above. This shall enable the bypass valve control loop.
8				c)	Request the start of the applicable condenser water pump and prove operation.
9 10				d)	After $$ condenser pump operation is proven, BAS shall start the applicable HPW pump and prove operation.
11 12 13				e)	Wait a maximum of 5 min. after the command to start the condenser pump for the HPW environment as specified above to be acceptable. If after 5 min. the environment is not acceptable, fail the pump and enunciate an alarm.
14 15				f)	On a failure to start any of the HPW loop pumps, fail the pump and start the standy pump and enunciate an alarm.
16		H.	HPV	V Stop	System Sequence
17 18			1.		en a HPW is no longer needed as called for by the BAS, the following sequence loccur:
19				a)	Wait 1 min. (adj.) then stop associated HPW pump.
20				b)	Stop the condenser water pump.
	• • •				
21	3.28	HW SY	STEN	<u> 1</u>	
22 23		A.			BAS shall fully control the hot water systems and equipment and provide g and diagnostic information for management purposes.
24		B.	Hea	ting E	nable: Heating shall be enabled continuously.
25		C.	Hot	Water	Load Determination
26 27			1.		water load shall be calculated instantaneously from the flow and temperature rence of the following loops
28				a)	Primary loop total
29				b)	Individual boiler circuits
30 31			2.		water load for the purposes of the staging the boilers shall be calculated as the nin average of the secondary circuit loads
32		D.	Boil	er Sta	ging: Boiler shall be staged as specified below
33 34 35 36 37		E.	and out a BAS	alarm and re S shall	coiler Operation: BAS shall prove the operation of the boilers via boiler status a points. When a boiler is assessed as failed, the run command shall be locked equire manual acknowledgment at the operator interface before it is restarted. then start the next boiler in rotation. The following conditions shall result in the ent that the boiler has failed:
38			1.	Loss	s of boiler status for more than 15s (adj.) while it is requested
39			2.		ure of boiler failure input
40 41			3.		ring hot water temperature is lower than setpoint minus 8°F for 10 min. inuously and boiler output is less than 67% of the rated output
42		F.	HW	Pump	o Control
43 44 45			1.	sequ	p shall be started when it is requested to run per the boiler start and stop uences specified below. Pumps shall run continuously when the respective or is requested. BAS shall prove operation of the pump.

1 2 3		2.	activ		prove operation of the pump however the request for the pump shall stay et it is failed. If a pump is assessed as failed, another standby pump shall ed.
4	G.	Boil	er Sta	aging	
5 6 7 8		1.	heat enal	ting wa [.] bled. If	control the starting and stopping of boilers to meet the demands of the ter systems. While heating is enabled, a minimum of one boiler shall be none are running at the start of the mode, start a boiler per the boiler nce specified below.
9 10 11		2.	star		onditions merit starting or stopping a boiler, BAS shall complete the stopping sequence regardless of temperature fluctuations during the
12 13 14 15			a)	For th secor calcul	e purposes of boiler staging control, a virtual point called "average and any heating water supply temperature" (ASHWST) shall be continuously ated and displayed. This value shall be the 10 minute average of the staneously sensed value.
16 17			b)		ditional boiler shall be requested and started per the boiler start sequence fied below when:
18 19 20				1)	the ASHWST falls more than 5°F below the secondary heating water supply setpoint for 5 min. (adj.) continuously. Upon this occurrence, a boiler shall be started per the boiler start sequence specified below
21 22				2)	AND when more than 15 min. (adj.) has elapsed since the start of the last boiler
23 24		3.			Il be stopped, per the boiler stop sequence specified below, based on HW d as follows:
25 26			a)		ooiler shall be stopped when the load falls below (Total Nominal Capacity- inal Capacity of Last Boiler*1.2)
27			b)	AND	when a minimum of 15 min. has elapsed since a boiler has been started.
28 29	H.		iting V trols.	Vater T	emperature Control: Temperature shall be maintained by boiler's internal
30	I.	Boil	er Sta	ırt Sequ	uence
31		1.	On a	a reque	st for a boiler to start, the BAS shall control the following sequence:
32			a)	Open	the boiler isolation valve.
33			b)	Start t	the HW pump associated with the boiler and prove its operation
34			c)	Enabl	e the boiler to start under its own controls
35 36 37			d)		or boiler status and prove operation. If status is not indicated within 3 es (adj.) of a command to start enunciate an alarm, disable and lock out .
38	J.	Boil	er Sto	p Sequ	ience
39		1.	Whe	en a boi	ler is no longer needed, the BAS shall control the following sequence:
40			a)	Disab	le the boiler and allow it to stop under its own controls
41			b)	Wait 2	2 min. (adj.) and Stop the primary HW pump associated with the boiler.
42			c)	Close	the boiler isolation valve.
43	K.	Pro	of Of I	Boiler C	Operation
14 45 46 47 48		1.	a bo man then	oiler is a nual ack n start th	prove the operation of the boilers via boiler status and alarm points. When assessed as failed, the run command shall be locked out and require knowledgment at the operator interface before it is restarted. BAS shall ne next boiler in rotation. The following conditions shall result in the that the boiler has failed:

1				a)	Loss of boiler status for more than 15s (adj.) while it is requested.
2				b)	Closure of boiler failure input
3 4				c)	Leaving boiler water temperature is below setpoint minus 20°F for 10 min. continuously.
5		L.	Boile	er Prid	prity Selection
6 7			1.		shall automatically prioritize the boilers for starting order. One of the following nods shall be employed to rotate and reprioritze the boilers.
8 9				a)	The boiler with the least run time shall be started first and the boiler with the greatest runtime shall be stopped first.
10 11				b)	The BAS shall provide a graphic screen to support the manual selection of boiler priorities.
12 13				c)	The boiler priorities shall be rotated based on a predetermined schedule. Owner shall dictate a regular schedule for the priorities to be switched.
14 15 16 17 18			2.	the r	rators shall be able to lock out boilers in "Maintenance Mode. This means that equests for this boiler and associated appurtenances shall be bypassed. This I be done through a graphic icon associated with a virtual point indicating ther the maintenance mode is active or via a property associated with the boiler.
19	3.29	<u>CENTR</u>	AL PI	_ANT	MONITORING AND MANAGEMENT
20 21		A.			The BAS shall monitor various aspects of the heating and cooling systems and parameters as specified below to facilitate plant operations and management.
22 23 24		В.	alar	m und	ondition Alarming: BAS shall monitor the following parameters and enunciate an ler any of the following conditions in addition to other monitor and alarm specified above
25 26			1.	Enu	nciate a Level 2 alarm when any active (water flowing) HPW supply temperature seds its setpoint plus 8°F (adj.) for 15 min. continuously as follows:
27 28				a)	Sensor XXX is indicating that the chilled water temperature is above acceptable limits.
29 30			2.		nciate a Level 2 alarm when any active (water flowing) HW supply temperature eds its minus 20°F (adj.) for 15 min. continuously as follows:
31 32				a)	Sensor XXX is indicating that the hot water temperature is below acceptable limits.
33 34			3.		nciate a Level 2 alarm when any active (water flowing) tower water supply perature exceeds 100°F (adj.) for 2 min. continuously as follows:
35 36				a)	Sensor XXX is indicating that the tower water temperature is above acceptable limits.
37 38			4.		nciate a Level 2 alarm when any active (water flowing) tower water supply perature falls below 55°F (adj.) for 2 min. continuously as follows:
39 40				a)	Sensor XXX is indicating that the tower water temperature is below acceptable limits.
41 42 43 44 45		C.	para the d hard	mete contro	The BAS shall continuously monitor, calculate and display the following rs at the intervals indicated. These values shall be stored initially in the buffer of elling control unit, and then be uploaded periodically and stored on a specified Contractor shall format reports from this data to support one of the following ats:
46			1.	Quo	te (text strings) and Comma delimited
47			2.		osoft EXCEL
48			3.		osoft ACCESS
49		D.	Para	amete	rs to be Trended:

1	1.	Load on the secondary systems in MBH per the following equation: (Return Temp-
2		Supply Temp) * (GPM) / .5. This shows cooling as a positive heat load and heating
3		as a negative heat load. Note that multipliers on this value to accommodate the BAS
4		processors are acceptable as long as clearly indicated.
5		This value shall be trended and stored every two hours.
6	2.	All temperature sensors at 1 hour intervals
7	3.	All relative humidity sensors at 1 hour intervals
8	4.	All pressure sensors at 1 hour intervals
9	5.	All run requests and statuses on a change in value
10	6.	All analog loop outputs on 1 hour intervals
11	7.	Calculated enthalpies in 2 hour intervals
12	8.	Summed cooling and heating requests on 2 hour intervals
13		
14		
15		
16	END OF SECTION 15	958

1 2	SECTI	SECTION 15959 - BAS SYSTEM COMMISSIONING								
3	PART	I.	GENERAL							
4	1.01	SECT	ION INCLUDES							
5		A.	BAS and equipment testing and start-up							
6		B.	Validation of proper and thorough installation of BAS and equipment							
7		C.	Functional testing of control systems							
8		D.	Documentation of tests, procedures, and installations							
9		E.	Coordination of BAS training							
10		F.	Documentation of BAS Operation and Maintenance materials							
11	1.02	RELA	TED SECTIONS:							
12 13		A.	Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.							
14		B.	Section 15050 -Basic Mechanical Materials and Methods							
15		C.	Section 15949 – BAS General Requirements							
16		D.	Section 15951 - BAS Basic Materials and Devices							
17		E.	Section 15952 - BAS Operator Interfaces							
18		F.	Section 15953 - BAS Field Panels							
19		G.	Section 15954 - BAS Communication Devices							
20		H.	Section 15955 - BAS Software and Programming							
21		I.	Section 15958 - Sequences of Operation							
22	1.03	GENE	RAL DESCRIPTION							
23 24		A.	This section further defines responsibilities of the ATC Contractor to facilitate the Commissioning process for the Building Automation System (BAS).							
25 26		B.	Refer to Section 15995 - "Mechanical System Commissioning" for general commissioning requirements including Definitions, Sequencing, and Responsibilities.							
27	1.04	CONT	RACTOR RESPONSIBILITIES							
28 29		A.	Prepare Draft Pre-Commissioning Test Report and submit to Commissioning Authority for approval.							
30 31		B.	Execute start-up and checkout and record data on the approved Pre-Commissioning Test Report Forms.							
32 33		C.	Assist Commissioning Authority in Functional Performance Testing. Assistance shall include but not be limited to the following:							
34 35 36 37			 Attend Commissioning progress and coordination meetings Prepare and submit required draft forms and systems information. Establish trend logs of system operation as specified herein Demonstration of system operation 							

- 1 5. System orientation
- Manipulate systems and equipment to facilitate testing.
 - 7. Provide instrumentation necessary for functional performance testing.
 - 8. Manipulate control systems to facilitate functional performance testing.
 - 9. Monitor the system during the Observation Period. Prepare and submit all required trend and alarm log data.
- 7 D. Train DC Governments Representatives in both systems operation and control equipment use, operation, maintenance and repair. Training shall be conducted as follows:
 - 1. Control system training shall be conducted by the Control Subcontractor. Control system training shall be as described in related sections and as specified in Part 3 of this section.
 - E. Provide a Control technician to work at the direction of Commissioning Agent for software optimization assistance. Refer to Part 3 for a description of the software optimization.
- F. Compensation for Retesting: Compensate DC Government for additional Commissioning
 Authority site time for retesting necessitated by incompleteness or failure of systems or
 equipment at time of functional performance testing.

16 1.05 <u>SUBMITTALS</u>

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- 17 A. Submit the following items in accordance with the submittal requirements set forth in Division 1.
 - 1. Draft Pre-Commissioning Test Report: Submit with BAS submittal, or within 60 calendar days of receipt of approved BAS submittal.
 - Submit required trend data and alarm logs covering the Observation Period, as specified below.
 - 3. Submit BAS training plan in accordance with the requirements of Section 15995 Mechanical System Commissioning.

24 PART II. PRODUCTS

25 2.01 INSTRUMENTATION

A. Instrumentation required to verify readings and test system and equipment performance shall be provided by Contractor and made available to Commissioning Authority. Generally, no testing equipment will be required beyond that required to perform Contractors work under these Contract Documents. All equipment used for testing and calibration shall be NIST/NBS traceable and calibrated within the preceding 6 month period. Certificates of calibration shall be submitted upon request.

32 2.02 TAB & CX PORTABLE OPERATORS TERMINAL

- A. Contractor shall provide a portable operators terminal or hand held device to facilitate TAB and calibration. This device shall support all functions and allow querying and editing of all parameters required for proper calibration and start up.
- B. Connections shall be provided local to the device being calibrated. For instance, for VAV boxes, connection of the operator's terminal shall be either at the room sensor or at the box.

38 2.03 <u>COMMISSIONING AUTHORITY WORKSTATION SOFTWARE</u>

A. Provide licensing and original software copies for one remote graphic workstation for the Commissioning Authority. Software shall include all workstation software required to view, edit and create system graphics, database, programming, trends, and the like. License shall be valid through the end of the warranty period for the project. Software shall be upgraded to manufacturer's current version should the version change during the warranty period.

PART III. PART 3 - EXECUTION

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3.01 BAS PRE-COMMISSIONING, START-UP TESTING, ADJUSTING, AND CALIBRATION

3 A. Work and/or systems installed under this Division shall be fully functioning before Demonstration, 4 Observation Periods and Contract Close Out. Contractor shall start, test, adjust, and calibrate all 5 work and/or systems under this Contract, as described below: 6 Inspect the installation of all devices. Review the manufacturer's installation instructions 7 and validate that the device is installed in accordance with the instructions. 8 Verify proper electrical voltages and amperages, and verify that all circuits are free from 2. 9 faults. 10 3. Verify integrity/safety of all electrical connections. 11 Verify proper interface with fire alarm and security systems as applicable. 12 5. For the following control settings, initially use the control setting that was used by existing 13 control system, unless otherwise indicated. For AHUs that use a throttled outside air damper position when minimum outside air is required, contractor shall mark existing 14 15 minimum outside air damper position to allow replication by new controls. 16 Coordinate with TAB subcontractor to obtain and CA to fine tune control settings that are determined from balancing procedures. Record the following control settings as obtained 17 from TAB contractor, and note any TAB deficiencies in the BAS Pre-commissioning Report: 18 19 Optimum duct static pressure setpoints for VAV air handling units. 20 b) Minimum outside air damper settings for air handling units 21 Minimum flow setpoints for chillers and boilers c) 22 Maximum flow setpoints for chillers d) 23 Optimum differential pressure setpoints for variable speed pumping systems e) 24 f) Calibration parameters for flow control devices such as VAV boxes and flow 25 measuring stations. 26 1) BAS contractor shall provide hand held device as a minimum to the TAB and 27 CA to facilitate calibration. Connection for any given device shall local to it 28 (i.e.: at the VAV box or at the thermostat). Hand held device or portable 29 operator's terminal shall allow querying and editing of parameters required for 30 proper calibration and start up. 31 Test, calibrate, and set all digital and analog sensing, and actuating devices. Document 32 calibration of each instrumentation device by making a comparison between the ATC 33 display and the reading at the device, at a normal operating point, using an instrument 34 traceable to the National Bureau of Standards, which shall be at least twice as accurate as the device to be calibrated (e.g., if field device is +/-0.5% accurate, test equipment shall be 35 36 +/-0.25% accurate over same range). Record the measured value and displayed value for 37 each device in the BAS Pre-Commissioning Report. 38 Check and set zero and span adjustments for all transducers and transmitters. 39 q For dampers and valves: 40 Check for adequate installation including free travel throughout range and adequate 41 seal 42 Where loops are sequenced, check for proper control without overlap 43 10. For actuators: 44 Check actuated devices under operating conditions. Manually activate damper and valve operators to verify free travel and fail condition. Check valve or damper to 45 46 insure that it shuts off tightly under operating conditions. Check to insure that device 47 seals tightly when the appropriate signal is applied to the operator.

Check for appropriate fail position, and that the stroke and range is as required

1 2 3 4 5	11.	com Che and	ck each digital output control point by making a comparison between the control mand at the control unit or operator workstation and the status of the controlled device. ck each digital input point by making a comparison of the state of the sensing device the control unit or operator workstation display. Record the results for each device in ATC/FMS Pre-Commissioning Report.
6 7 8	12.	and	outputs to reset other manufacturers devices (for example: variable frequency drives) feedback from them, calibrate ranges to establish proper parameters. Coordinate with esentative of the respective manufacturer and obtain their approval of the installation.
9 10 11	13.	Verif ATC	by proper sequences by using the approved checklists to record results and submit with FMS Pre-Commissioning Report. Verify proper sequence and operation of all cified functions.
12	14.	Verif	y all safety devices trip at appropriate conditions. Adjust setpoints accordingly.
13 14 15 16 17	15.	over ATC max With cont	e all control loops to obtain the fastest stable response without hunting, offset or shoot. Record tuning parameters and response test results for each control loop in the /FMS Pre-Commissioning Report. Except from a startup or step change in setpoint, imum allowable variance from set point for controlled variables shall be as follows. in 3 minutes of any upset (for which the system has the capability to respond to) in the rol loop, tolerances shall be maintained (exceptions noted):
19		a)	Duct air temperature: ±1°F.
20		b)	Space Temperature: ±2°F
21		c)	Chilled Water: ±1°F
22		d)	Hot water temperature: ±3°F.
23		e)	Duct pressure: ± 0.25" w.g.
24		f)	Water pressure: ±1 psid
25		g)	Duct or space Humidity: ±5%
26 27		h)	Air flow control: $\pm 5\%$ of setpoint velocity. For min OA flow loops being reset from CO2, response to upset maximum time is one hour
28	16.	For i	nterface and DDC control panels:
29 30		a)	Ensure devices are properly installed with adequate clearance for maintenance and clearly labeled in accordance with the record drawings
31 32		b)	Ensure terminations are safe, secure and labeled in accordance with the record drawings $% \left(1\right) =\left(1\right) \left(1\right) +\left(1\right) \left(1\right) \left(1\right) +\left(1\right) \left(1\right$
33		c)	Check power supplies for proper voltage ranges and loading.
34 35		d)	Ensure wiring and tubing are run in a neat and workman-like manner, either bound or enclosed in trough.
36		e)	Check for adequate signal strength on communication networks.
37 38 39		f)	Check for stand alone performance of controllers by disconnecting the controller from the LAN. Verify the event is enunciated at operator interfaces. Verify that the controlling LAN reconfigures as specified in the event of a LAN disconnection
40		g)	Ensure all outputs and devices fail to their proper positions/states.
41		h)	Ensure buffered and/ or volatile information is held through power outage
42 43		i)	With all system and communications operating normally, sample and record update/enunciation times for critical alarms fed from the panel to the OWS.
14		j)	Check for adequate grounding of all DDC panels and devices
45	17.	For (Operator Interfaces:
46 47		a)	Verify all elements on the graphics are functional and properly bound to physical devices and/or virtual points and that hot links or page jumps are functional and

Output all specified FMS reports for review and approval.

logical.

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1 Verify the alarm printing and logging is functional and per requirements 2 d) Verify trend archiving to disk and provide a sample to the CA for review 3 e) Verify paging/dial out alarm enunciation is functional 4 f) Verify functionality of remote operator interfaces and that a reliable connection can be 5 established consistently. Verify that required third party software applications required with the bid are installed 6 g) 7 and functional. 8 В. Submit Start-Up Test Report. Report shall be completed, submitted and approved before 9 Substantial Completion. 3.02 10 SENSOR CHECKOUT AND CALIBRATION General Checkout: Verify that all sensor locations are appropriate and away from causes of 11 Α. 12 erratic operation. Verify that sensors with shielded cable are grounded only at one end. For 13 sensor groups that are used to determine a temperature or pressure difference, make sure they 14 are reading within 0.2°F of each other for temperature and within a tolerance equal to 2% of the reading, of each other, for pressure. Tolerances for critical applications may be tighter. 15 В. 16 Calibration: Calibrate all sensors using one of the following procedures: 17 Sensors without transmitters and sensors with integral transmitter--Standard Application: Make a reading with a calibrated test instrument within 6 inches of the site sensor at 18 various points across the range. Verify that the sensor reading (via the permanent indicator 19 20 or FMS) is within the tolerances specified for the sensor. If not, adjust offset and range as 21 necessary, or replace sensor. For sensors operating within a narrow range (for example: 22 space temperature, space humidity, chilled water, and similar applications) a single point 23 reading shall be acceptable. 24 Sensors with transmitters that require separate calibration -- Standard Application. 25 Disconnect sensor. Connect a signal generator in place of sensor. Connect ammeter in 26 series between transmitter and FMS control panel. Using manufacturer's resistance-27 temperature data, simulate minimum desired temperature. Adjust transmitter potentiometer 28 zero until 4 mA is read by the ammeter. Repeat for the maximum temperature matching 20 29 mA to the potentiometer span or maximum and verify at the Q. Record all values and 30 recalibrate controller as necessary to conform to tolerances. Reconnect sensor. Make a 31 reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the 32 sensor reading (via the permanent indicator or FMS) is within the tolerances specified. If 33 not, replace sensor and repeat. For pressure sensors, perform a similar process with a 34 suitable signal generator. 35 C. Sensor Tolerance: Sensors shall be within the tolerances specified for the device. Refer to 36 Section 15951 37 3.03 **LOOP TUNING** For all control loops, contractor shall tune the loops to ensure the fastest stable response without 38 A. 39 hunting, offset or overshoot. Contractor shall introduce upsets to the load when possible to 40 affect response. Otherwise, setpoints can be changed to affect the response. 41 В. Generally tune loops during periods of high gain.

Document all parameters either by capturing text, short interval trends, or screen shots of trend

C.

graph documenting the final response.

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2 3.04 VALVE STROKE SETUP AND CHECK

- A. For all valve and actuator positions checked, verify the actual position against the OI readout.
 - B. Set pumps to normal operating mode. Command valve closed, verify that valve is closed and adjust output zero signal as required. Command valve open, verify position is full open and adjust output signal as required. Command valve to a few intermediate positions. If actual valve position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

3.05 COIL VALVE LEAK CHECK

A. Verify proper close off of the valves. Ensure the valve seats properly by simulating the maximum anticipated pressure difference across the circuit. Calibrate air temperature sensors on each side of coil to be within 0.5°F of each other. Via the OI, command the valve to close. Energize fans. After 5 minutes observe air temperature difference across coil. If a temperature difference is indicated, and the piping surface temperature entering the coil is within 3°F of the water supply temperature, leakage is probably occurring. If it appears that it is occurring, close the isolation valves to the coil to ensure the conditions change. If they do, this validates the valve is not closing. Remedy the condition by adjusting the stroke and range, increasing the actuator size/torque, replacing the seat or replacing the valve as applicable.

3.06 BAS DEMONSTRATION AND ORIENTATION

- A. The intent of the demonstration and orientation is to provide the DC Government and Commissioning Authority with a reasonable level of assurance that the system is complete and ready for functional performance testing, and to provide an initial orientation to the system configuration, set-up, features, and commissioning related procedures.
- B. Demonstrate the operation of a sampling of the BAS hardware, software, and all related components and systems to the satisfaction of the Commissioning Authority. Schedule the demonstration with the DC Government's representative 2 weeks in advance. Demonstration shall not be scheduled until all hardware and software submittals, and the Pre-Commissioning Test Report are approved. If in the judgment of the Commissioning Authority the Work fails to be demonstrated to be complete and ready for functional testing, so as to require additional site visits by the Commissioning Authority for re-demonstration, Contractor shall reimburse DC Government for all costs of subsequent Commissioning Authority site visits for demonstration.
- C. The Contractor shall supply all personnel and equipment for the demonstration, including, but not limited to, instruments, ladders, etc. Contractor supplied personnel shall be competent with and knowledgeable of all project-specific hardware, software, and the HVAC systems. All documentation and submittals shall be at the job site.
- D. The system shall be demonstrated following the same procedures used in the Pre-Commissioning Test. Demonstration shall include, but not necessarily be limited to, the following:
 - 1. Demonstrate that all required software is installed on FMS workstations. Demonstrate that all graphic screens, alarms, trends, and reports are installed as submitted and approved.
 - Demonstrate that a sampling of points specified and shown can be interrogated and/or commanded (as applicable) from all workstations, as specified.
 - 3. Demonstrate that remote dial-up communication abilities (as applicable) are in accordance with contract requirements.
 - 4. Demonstrate correct calibration and calibration procedure for a sampling of input/output devices selected by the DC Government and Commissioning Authority.
 - 5. Demonstrate that all DDC and other software programs exist at respective field panels. The Direct Digital Control (DDC) programming and point database shall be as submitted and approved.

- 6. Demonstrate that all DDC programs accomplish the specified sequences of operation.
 - 7. Demonstrate that the panels automatically recover from power failures, as specified.
 - 8. Demonstrate that the stand-alone operation of panels meets the requirements of these Specifications. Demonstrate that the panels' response to LAN communication failures meets the requirements of these Specifications.
 - E. BAS Demonstration shall be completed before Substantial Completion.

3.07 BAS OBSERVATION PERIOD

- A. After approval of the BAS Demonstration, the completion of functional performance testing, and before Contract Close Out, the BAS shall enter an Observation Period of two weeks. The Observation Period shall not be scheduled until
 - 1. All HVAC systems are in operation and have passed functional testing.
 - 2. All required cleaning, lubrication, and routine service has been completed. Routine service shall include but not be limited to strainer cleaning and filter replacement.
 - 3. The TAB report has been submitted and approved
- B. Schedule the beginning of the Observation Period with the Commissioning Authority 2 weeks in advance. During the Observation Period, the system shall operate properly without malfunction, without alarm caused by control action or device failure, and with smooth and stable control of systems and equipment in conformance with these specifications.
- C. At the end of the two weeks, the contractor shall forward the trend logs to the CA for review and the Commissioning Authority shall provide written rotification of the pass/fail status of the Observation Period including documentation of any deficiencies requiring contractor attention.
 - 1. Should problems occur during the initial Observation Period, the contractor shall correct problems and provide notification to the DC Government's representative that all problems have been corrected. The Observation Period shall be restarted at a mutually scheduled time for an additional one-week period. This process shall be repeated until the Commissioning Authority issues notice that the BAS has passed the Observation Period without exception.
- D. During the Observation Period, the contractor shall maintain a hard copy log of all alarms generated by the BAS, and the controller network and workstation hardware and software shall be maintained so that the Commissioning Authority shall have remote dial-in or Internet access to the alarm logs. For each alarm received, contractor shall diagnose the cause of the alarm, and shall list on the log for each alarm, the diagnosed cause of the alarm, and the corrective action taken. If in the contractor's opinion, the cause of the alarm is not the responsibility of the contractor, contractor shall immediately notify the DC Government's representative.
- E. During the Observation Period, the contractor shall maintain all controller network and workstation hardware and software in a state that will allow remote access by Commissioning Authority to Trend Logs as specified below.

38 3.08 TREND LOGS

- A. Trend logs are databases of ASCII characters (usually numbers) representing a historical record of the systems operation. Contractor shall establish and store these trend logs. Trend logs shall be prepared for each physical input and output point, and all dynamic virtual points such as setpoints subject to a reset schedule, intermediate setpoint values for cascaded control loops, and the like.
- B. CA will analyze trend logs of the system operating parameters to evaluate normal system functionality. Contractor shall establish these trends, ensure they are being stored properly, and forward the data in electronic format to the CA upon completion of the observation period.

BAS System Commissioning KCI/SHW Joint Venture

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- C. Data shall include a single row of field headings and the data thereafter shall be contiguous. Each record shall include a date and time field. Recorded parameters for a given piece of equipment or component shall be trended at the same intervals and be presented in a maximum of two separate two dimensional formats with time being the vertical axis and field name being the horizontal axis. Data shall be forwarded in one of the following formats.
 - 1. Microsoft ACCESS Database (.mdb)
 - 2. Microsoft EXCEL Spreadsheet (.xls)
 - Comma Separated Value (.csv or .txt) preferably with quotes delimiting text fields and # delimiting date/time fields
- D. Sample times indicated as COV (±) or change of value mean that the changed parameter only needs to be recorded after the value changes by the amount listed. When output to the trending file, the latest recorded value shall be listed with any given time increment record. If the FMS does not have the capability to record based on COV, the parameter shall be recorded based on the interval common to the unit.
- E. A complete set of trend logs shall consist of all required points, trended for the time period listed for each point category. Point values shall be recorded based on the change-of-value (COV) differentials listed. If the ATC/FMS does not have the capability to trend based on COV, then point values shall be trended based on the time intervals listed:

POINT CATEGORY	C.O.V.	TIME INTERVAL	TIME PERIOD
DUCT PRESSURE	0.02 IN. W.G. 1 MINUTE		4 HOURS
TEMPERATURE	0.2 DEGREES F	10 MINUTES	24 HOURS
HUMIDITY	1 PERCENT RH	10 MINUTES	24 HOURS
FAN VOLUME CONTROL OUTPUT	1 PERCENT	1 MINUTE	4 HOURS
VALVE AND DAMPER OUTPUTS	1 PERCENT	10 MINUTES	24 HOURS

F. Contractor shall provide the CA with required passwords, phone numbers, etc. to allow the CA access to the trend log data and allow downloading to a remote location. Contractor shall also provide step-by-step written instructions for accessing the data.

23 3.09 TREND GRAPHS

- A. Trend graphs shall generally be used during the functional testing and Observation Periods to facilitate and document testing. Prepare controller and workstation software to display graphical format trends during the Observation Period. Trend graphs shall demonstrate compliance with contract documents. Trended values and intervals shall be the same as those specified for the functional performance tests.
- B. Lines shall be labeled and shall be distinguishable from each other by using either different line types, or different line colors.
- 31 C. Indicate engineering units of the y-axis values; e.g. degrees F., inches w.g., Btu/lb, percent wide open, etc.
- D. The y-axis scale shall be chosen so that all trended values are in a readable range. Do not mix trended values on one graph if their unit ranges are incompatible.

- 1 E. Trend outside air temperature, humidity, and enthalpy during each period in which any other points are trended.
- F. All points trended for one HVAC subsystem (e.g. air handling unit, chilled water system, etc.) shall be trended during the same trend period.
 - G. Each graph shall be clearly labeled with HVAC subsystem title, date, and times.

6 3.10 WARRANTY PHASE BAS OPPOSITE SEASON TRENDING AND TESTING:

- A. Trending: Throughout the Warranty Phase, trend logs shall be maintained as required for the Observation Period. Contractor shall forward archived trend logs to the CA for review upon CA's request. CA will review these and notify contractor of any warranty work required.
- B. Opposite Season Testing: Within 6 months of completion of the Observation Phase, CA shall schedule and conduct Opposite Season functional performance testing. Contractor shall participate in this testing and remedy any deficiencies identified.

13 3.11 SOFTWARE OPTIMIZATION ASSISTANCE

- A. The contractor shall provide the services of a controls technician for a maximum of 16 man-hours at the project site to be at the disposal of the Commissioning Authority. The purpose of this requirement is to make changes, enhancements and additions to control unit and/or workstation software that have been identified by the Commissioning Authority during the construction and commissioning of the project and that are beyond the specified Contract requirements. The cost for this service shall be included with the bid. Requests for assistance shall be for contiguous or non-contiguous 8-hour days, unless otherwise mutually agreed upon by contractor, Commissioning Authority, and DC Government. The DC Government's representative shall notify contractor 2 days in advance of each day of requested assistance.
- B. The controls technician provided shall be thoroughly trained in the programming and operation of the controller and workstation software. If the controls technician provided cannot perform every software task requested by the Commissioning Authority in a timely fashion, contractor shall provide additional qualified personnel at the project site as requested by the Commissioning Authority, to meet the specified time requirement.
- C. If any part of this requirement is scheduled during the Observation Period, such changes made because of this requirement shall not prevent approval of the Observation Period. However, during the Opposite Season Observation Period such changes shall be demonstrated to perform as documented by the Commissioning Authority.

3.12 BAS OPPOSITE SEASON OBSERVATION PERIOD:

A. During the warranty period, but not later than 6 months from completion of the initial Observation Period, BAS shall enter an Opposite Season Observation Period of two weeks. Opposite Season Observation Period shall not be scheduled until seasonal conditions have changed to the opposite of those that occurred during the initial Observation Period. Schedule the beginning of the Opposite Season Observation Period with the DC Government's representative 2 weeks in advance. All requirements specified for the Observation Period shall also apply to the Opposite Season Observation Period.

40 3.13 BAS OPERATOR TRAINING:

A. Provide services of controls contractor's qualified technical personnel for five 8-hour days to instruct DC Government's personnel in operation and maintenance of control systems. The Commissioning Authority shall attend the training (or a portion thereof) per Commissioning Authority's agreement with DC Government. Instruction shall be in a classroom setting at the project site. Requests for assistance shall be for contiguous or non-contiguous 8-hour days, unless otherwise mutually agreed upon by contractor, Commissioning Authority, and DC

1 2				ent. The DC Government's representative shall notify contractor 1 week in advance of of requested training.
3 4	В.		/ide u rainin	p to 4 complete sets of the approved Operations and Maintenance Manual to be used g.
5 6 7	C.	resp	onsib	or shall submit a Training Plan as outlined in the Cx plan for the scope of training he is ble. Training Plan shall be forwarded to the Division 15 contractor who will compile, format, and forward to the CA.
8 9 10	D.	DC	Gove	ractor's designated training personnel shall meet with the Commissioning Authority and ernment's representative for the purpose of discussing and fine-tuning the training efore the first training session. Training agenda shall generally be as follows:
11		1.	Day	1:
12 13 14			a)	Brief walk-through of building, including identification of all controlled equipment and condensed demonstration of CU portable and built-in operator interface device display capabilities.
15 16 17			b)	Brief overview of the various parts of the O&M manual, including hardware and software programming and operating publications, catalog data, controls installation drawings, and DDC programming documentation.
18 19			c)	Demonstration of workstation login/logout procedures, password setup, and exception reporting
20 21			d)	Demonstration of workstation menu penetration and broad overview of the various workstation features
22		2.	Day	2 & 3:
23			a)	Introduction to CU programming
24 25			b)	Review of sequence of operation, CU programming, standalone modes, fail modes and graphic workstation screen for each HVAC subsystem.
26		3.	Day	4:
27			a)	Review of alarm feature
28			b)	Review of diagnostics features
29			c)	Review of I/O hardware testing, calibration, and replacement
30			d)	Review of trend feature
31			e)	Review of workstation reports.
32			f)	Review of setpoint optimization and fine-tuning concepts
33		4.	Day	5:
34			a)	Review of all remaining miscellaneous workstation features.
35			b)	Question and answer period.
36				

END SECTION 15959

1 SECTION 16139 - CABLE TRAYS

2 PART 1 - GENERAL

3 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

6 1.2 SUMMARY

- 7 A. This Section includes steel cable trays and accessories.
- 8 B. Related Sections include the following:
- 9 1. Division 7 Section "Through-Penetration Firestop Systems" for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.

 11 2. Division 16 Section "Basic Electrical Materials and Methods" for cable tray supports not specified in
 - 2. Division 16 Section "Basic Electrical Materials and Methods" for cable tray supports not specified in this Section.

13 1.3 <u>SUBMITTALS</u>

- 14 A. Product Data: Include data indicating dimensions and finishes for each type of cable tray indicated.
- 15 B. Shop Drawings: For each type of cable tray.
- 1. Show fabrication and installation details of cable tray, including plans, elevations, and sections of components and attachments to other construction elements. Designate components and accessories, including clamps, brackets, hanger rods, splice-plate connectors, expansion-joint assemblies, straight lengths, and fittings.
 - 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Coordination Drawings: Floor plans and sections drawn to scale. Include scaled cable tray layout and relationships between components and adjacent structural and mechanical elements. Show the following:
- 24 1. Vertical and horizontal offsets and transitions.
 - 2. Clearances for access above and to side of cable trays.
 - Vertical elevation of cable trays above floor or bottom of ceiling structure.
- D. Product Certificates: For each type of cable tray, signed by product manufacturer.
- 28 E. Qualification Data: For testing agency.
- 29 F. Field Test Reports: Written reports specified in Part 3.

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2	1.4	QUALITY ASSURANCE				
3 4 5	A.	Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.				
6	В.	Source Limitations: Obtain cable tray components through one source from a single manufacturer.				
7 8	C.	Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.				
9	D.	Comply with NFPA 70.				
10	1.5	COORDINATION				
11 12 13	A.	Coordinate layout and installation of cable trays and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.				
14	PART 2	- <u>PRODUCTS</u>				
15	2.1	MANUFACTURERS				
16	A.	Manufacturers: Subject to compliance with requirements, provide products by one of the following:				
17 18 19 20 21 22 23 24		 B-Line Systems, Inc. Chalfant Cable Trays. GS Metals Corp. Mono-Systems, Inc. MPHusky. P-W Industries, Inc. Thomas & Betts Corporation. Carbofil, Inc. 				
25	2.2	MATERIALS AND FINISHES				
26	A.	Cable Trays, Fittings, and Accessories: Galvanized Steel.				
27	B.	Fabricate cable tray products with rounded edges and smooth surfaces.				

28 2.3 <u>CABLE TRAY ACCESSORIES</u>

- 29 A. Fittings: Tees, crosses, risers, elbows, and other fittings as indicated, of same materials and finishes as cable tray.
- 31 B. Barrier Strips: Same materials and finishes as cable tray.
- 32 C. Cable tray supports and connectors, including bonding jumpers, as recommended by cable tray manufacturer.

1 2.4 WARNING SIGNS

- A. Lettering: 1-1/2-inch- high, black letters on yellow background with legend "WARNING! NOT TO BE USED AS WALKWAY, LADDER, OR SUPPORT FOR LADDERS OR PERSONNEL."
- 4 B. Materials and fastening are specified in Division 16 Section "Basic Electrical Materials and Methods."
- 5 2.5 SOURCE QUALITY CONTROL
- A. Perform design and production tests according to NEMA VE 1.

7 PART 3 - EXECUTION

8 3.1 <u>EXAMINATION</u>

- 9 A. Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- 11 B. Proceed with installation only after unsatisfactory conditions have been corrected.

12 3.2 <u>CABLE TRAY INSTALLATION</u>

- 13 A. Remove burrs and sharp edges from cable trays.
- 14 B. Fasten cable tray supports securely to building structure as specified in Division 16 Section "Basic Electrical Materials and Methods," unless otherwise indicated.
- 1. Locate and install supports according to NEMA VE 1.
- 17 C. Make changes in direction and elevation using standard fittings.
- 18 D. Make cable tray connections using standard fittings.
- 19 E. Locate cable tray above piping unless accessibility to cable tray is required or unless otherwise indicated.
- F. Seal penetrations through fire and smoke barriers according to Division 7 Section "Through-Penetration Firestop Systems."
- 22 G. Workspace: Install cable travs with sufficient space to permit access for installing cables.
- H. Install barriers to separate cables of different systems, such as power, communications, and data processing.
- 25 I. After installation of cable trays is completed, install warning signs in visible locations on or near cable trays.
- J. Provide grounding per NFPA 70.

28 3.3 CONNECTIONS

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A. Ground cable trays according to manufacturer's written instructions.

1 B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3 3.4 FIELD QUALITY CONTROL

- 4 A. Testing: Perform the following field quality-control testing:
 - After installing cable trays and after electrical circuitry has been energized, test for compliance with requirements.
 - 2. Perform the following electrical test and visual and mechanical inspections:
 - a. Visually inspect each cable tray joint and each ground connection for mechanical continuity.
 - b. Measure ground resistance of each system of cable tray from the most remote element to the point where connection is made to service disconnect enclosure grounding terminal. Record resistance in ohms.
- 12 3. Report results in writing.

13 3.5 PROTECTION

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- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure cable tray is without damage or deterioration at time of Substantial Completion.
- Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.
- 18 END OF SECTION 16139

1 **SECTION 16511 - INTERIOR LIGHTING**

2 PART 1 - GENERAL

3 1.1 **RELATED DOCUMENTS**

4 5 A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

6 1.2 **SUMMARY**

- 7 A. This Section includes the following:
- 1. Interior lighting luminaires with lamps and ballasts.
- 8 2. Lighting luminaires mounted on exterior building surfaces.
- 10 3. Emergency lighting units.
- 11 4. Exit signs.
- 12 Accessories, including occupancy sensors.. 5.
- 13 B. Related Sections include the following:
- 14 1. Division 16 Section "Wiring Devices" for manual wall-box dimmers for incandescent lamps.
- 15 Division 16 Section "Lighting Control Devices" for automatic control of lighting, including time 2. 16 switches, photoelectric relays and occupancy sensors.
 - 3. Division 16 Section "Dimming Controls" for architectural dimming systems.

18 **DEFINITIONS** 1.3

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- 19 A. BF: Ballast factor. Ratio of light output of a given lamp(s) operated by the subject ballast to the light 20 output of the same lamp(s) when operated on an ANSI reference circuit.
- 21 B. CRI: Color rendering index.
- 22 C. CU: Coefficient of utilization.
- 23 D. LER: Luminaire efficiency rating, which is calculated according to NEMA LE 5. This value can be 24 estimated from photometric data using the following formula:
- 1. LER is equal to the product of total rated lamp lumens times BF times luminaire efficiency, divided 26 by input watts.
- 27 E. RCR: Room cavity ratio.

28 1.4 **SUBMITTALS**

- Product Data: For each type of lighting luminaire scheduled, arranged in order of luminaire designation. A. 30 Include data on features, accessories, finishes, and the following:
- 1. Physical description of luminaire, including dimensions and verification of indicated parameters.
- 2. Emergency lighting unit battery and charger.
 - 3. Fluorescent and high-intensity-discharge ballasts.
- 4. Lamps.

- 1 B. Wiring Diagrams: Power, signal, and control wiring.
- 2 C. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - Suspended ceiling components.
 - 2. Structural members to which lighting-luminaire suspension systems will be attached.
 - Other items in finished ceiling, including the following:
- 7 a. Air outlets and inlets.
 - b. Speakers.
 - c. Sprinklers.
- d. Access panels.
- 11 4. Perimeter moldings.

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- D. Product Certificates: For each type of ballast for dimmer-controlled luminaires, signed by product manufacturer.
- 14 E. Source quality-control test reports.
- 15 F. Field quality-control test reports.
- 16 G. Operation and Maintenance Data: For lighting equipment and luminaires to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Closeout Procedures," include the following:
- 19 1. Catalog data for each luminaire. Include the diffuser, ballast, and lamps installed in that luminaire.
- 20 H. Warranties: Special warranties specified in this Section.

21 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 - Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing
 Association or the National Institute for Certification in Engineering Technologies to supervise onsite testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- 31 C. Comply with NFPA 70.
- D. NFPA 101 Compliance: Emergency, exit and egress lighting shall comply with visibility and luminance requirements.
- 34 1.6 COORDINATION
- 35 A. Coordinate layout and installation of lighting luminaires and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1 1.7 WARRANTY

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- 23 Special Warranty for Emergency Lighting Unit Batteries: Manufacturer's standard form in which A. manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of 4 rechargeable batteries that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 10 years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining nine years.
- 7 B. Special Warranty for Fluorescent Ballasts: Manufacturer's standard form in which ballast manufacturer 8 agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.
- 9 1. Warranty Period for Electronic Ballasts: Five years from date of Substantial Completion.
- 10 Warranty Period for Electromagnetic Ballasts: Three years from date of Substantial Completion. 2.
- 11 C. Manufacturer's Special Warranty for T8 Fluorescent Lamps: Manufacturer's standard form, made out to 12 Owner and signed by lamp manufacturer agreeing to replace lamps that fail in materials or workmanship. 13 f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
- 14 1. Warranty Period: Two years from date of Substantial Completion.

15 1.8 **EXTRA MATERIALS**

- 16 A. Furnish extra materials described below that match products installed and that are packaged with 17 protective covering for storage and identified with labels describing contents.
- 18 1. Lamps: 4 for every 100 of each type and rating installed. Furnish at least one of each type.
- 19 Plastic Diffusers and Lenses: 1 for every 100 of each type and rating installed. Furnish at least 2. 20 21 one of each type.
- 3. Battery and Charger Data: One for each emergency lighting unit.
- 22 Ballasts: 1 for every 100 of each type and rating installed. Furnish at least one of each type. 4.
- $\overline{23}$ Globes and Guards: 1 for every 20 of each type and rating installed. Furnish at least one of each 5. 24 type.

25 PART 2 - PRODUCTS

26 2.1 **MANUFACTURERS**

- 27 A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
- 29 1. Products: Subject to compliance with requirements, provide one of the products 30 specified.
- 31 2.2 LUMINAIRES AND COMPONENTS, GENERAL
- 32 A. Recessed Luminaires: Comply with NEMA LE 4 for ceiling compatibility for recessed luminaires.
- 33 B. Incandescent Luminaires: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5A.
- Fluorescent Luminaires: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 C. 35 and NEMA LE 5A as applicable.
- 36 D. HID Luminaires: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.

- 1 E. Metal Parts: Free of burrs and sharp corners and edges.
- 23 F. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.
- 4 5 6 7 G. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- 8 Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated: H.
- 9 White Surfaces: 85 percent. 1.
- 10 Specular Surfaces: 83 percent. 2.
- 11 3. Diffusing Specular Surfaces: 75 percent.
- 12 Laminated Silver Metallized Film: 90 percent. 4.
- 13 I. Plastic Diffusers. Covers. and Globes:
- 14 1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other 15 changes due to aging, exposure to heat, and UV radiation.
- 16 Lens Thickness: At least 0.125 inch minimum unless different thickness is scheduled. a.
- 17 UV stabilized. b.
- 18 2. Glass: Annealed crystal glass, unless otherwise indicated.

19 2.3 LIGHTING LUMINAIRES

20 A. Luminaire: see luminaire schedule on drawings

21 2.4 **FLUORESCENT LAMP BALLASTS**

- 22 Description: Include the following features, unless otherwise indicated: A.
 - 1. Designed for type and quantity of lamps indicated at full light output except for emergency lamps powered by in-luminaire battery-packs]
 - 2. Externally fused with slow-blow type rated between 2.65 and 3.0 times the line current.
- 26 В. Electronic ballasts for linear lamps shall include the following features, unless otherwise indicated:
- 27 28 29 30 31 32 33 34 1. Comply with NEMA C82.11.
 - 2. Ballast Type: Instant start, unless otherwise indicated.
 - 3. Programmed Start: Ballasts with two-step lamp starting to extend life of frequently started lamps.
 - 4. Sound Rating: A.

23 24 25

- 5. Total harmonic distortion rating of less than 20 percent according to NEMA C82.11.
- Transient Voltage Protection: IEEE C62.41, Category A. 6.
 - Operating Frequency: 20 kHz or higher. 7.
 - Lamp Current Crest Factor: Less than 1.7. 8.
- 35 Parallel Lamp Circuits: Multiple lamp ballasts connected to maintain full light output on surviving 9. 36 lamps if one or more lamps fail.
- 37 C. Electromagnetic ballasts for linear lamps shall have the following features, unless otherwise indicated:
- 1. Comply with NEMA C82.1.
 - Type: Energy-saving, high power factor, Class P, automatic-reset thermal protection. 2.
- 40 3. Ballast Manufacturer Certification: Indicated by label.

1 D. Ballasts for compact lamps in recessed luminaires shall have the following features, unless otherwise 2 indicated: 3 4 5 6 7 8 9 1. Type: Electronic. 2. Power Factor: 90 percent, minimum. 3. Flicker: Less than 5 percent. Lamp Current Crest Factor: Less than 1.7. 4. Electronic Ballast Operating Frequency: 20 kHz or higher. 5. Lamp end-of-life detection and shutdown circuit. 6. 7. Transient Protection: Comply with IEEE C62.41 for Category A1 locations. 10 8. Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment. 11 12 E. Ballasts for compact lamps in nonrecessed luminaires shall include the following features, unless 13 otherwise indicated: 14 1. Power Factor: 90 percent, minimum. 15 Ballast Coil Temperature: 65 deg C, maximum. 2. 16 Transient Protection: Comply with IEEE C62.41 for Category A1 locations. 3. 17 Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on 4. Interference: electromagnetic and radio-frequency interference for nonconsumer equipment. 18 19 20 F. Ballasts for Low-Temperature Environments: 21 1. Temperatures 0 deg F and Higher: Electronic type rated for 0 deg F minus 17 deg C starting $\overline{22}$ temperature. 23 Ballasts for Low Electromagnetic-Interference Environments: Comply with 47 CFR, Chapter 1, Part 18, G. Subpart C, for limitations on electromagnetic and radio-frequency interference for consumer equipment. 25 2.5 HIGH-INTENSITY-DISCHARGE LAMP BALLASTS 26 27 A. General: Comply with NEMA C82.4 and UL 1029. Shall include the following features, unless otherwise indicated. 28 29 30 1. Type: Constant-wattage autotransformer or regulating high-power-factor type. 2. Minimum Starting Temperature: Minus 22 deg FMinus 30 deg C for single-lamp ballasts. 3. Normal Ambient Operating Temperature: 104 deg F40 deg C. Open-circuit operation that will not reduce average life. 4. 32 33 B. Auxiliary, Instant-On, Quartz System: Automatically switches quartz lamp on when luminaire is initially energized and when momentary power outages occur. Automatically turns quartz lamp off when high-34 intensity-discharge lamp reaches approximately 60 percent light output. Quartz lamp shall be powered 35 from the luminaire ballast and shall not require a separate branch circuit. 36 C. Low-Noise Ballasts: Manufacturers' standard epoxy-encapsulated models designed to minimize 37 audible luminaire noise 38 2.6 **EXIT SIGNS** 39 General: Comply with UL 924; for sign colors and lettering size, comply with authorities having jurisdiction. A.

Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum of rated lamp life.

1.

B.

Internally Lighted Signs:

40

1 2.7 EMERGENCY BATTERY PACK LIGHTING UNITS

- 2 A. General: Self-contained units complying with UL 924.
 - Battery: Sealed, maintenance-free, lead-acid type with minimum 10-year nominal life and special 1. warranty.
 - 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
 - 3. Operation: Relay automatically turns lamp on when power supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - Wire Guard: Where indicated, heavy-chrome-plated wire guard protects lamp heads or luminaires. 4.
 - 5. Integral Time-Delay Relay: Holds unit on for fixed interval when power is restored after an outage; time delay permits high-intensity-discharge lamps to restrike and develop adequate output.

13 2.8 **FLUORESCENT LAMPS**

10

11

12

- 14 Low-Mercury Lamps: Comply with Federal toxic characteristic leaching procedure test, and yield less than A. 15 0.2 mg of mercury per liter, when tested according to NEMA LL 1.
- 16 В. T8 rapid-start low-mercury lamps, rated 32 W maximum, 2800 initial lumens (minimum), CRI of 82 17 (minimum), color temperature of 3500 K, and average rated life of 20,000 hours, unless otherwise 18 indicated.
- 19 C. T8 rapid-start low-mercury lamps, rated 17 W maximum, nominal length of 24 inches610 mm, 1300 initial 20 lumens (minimum), CRI of 82 (minimum), color temperature of 3500 K, and average rated life of 20,000 21 hours, unless otherwise indicated.
- 22 23 24 25 26 D. Compact Fluorescent Lamps: CRI 82 (minimum), color temperature 3500, average rated life of 10,000 hours at 3 hours operation per start, unless otherwise indicated.
 - T4, Double-Twin Tube: Rated 13 W, 900 initial lumens (minimum). 1.
 - PLT Triple Tube: Rated 32 W, 2400 initial lumens (minimum). 2.
- 27 PLT Triple Tube: Rated 42 W. 3200 initial lumens (minimum). 3.

28 2.9 **HIGH-INTENSITY-DISCHARGE LAMPS**

Metal-Halide Lamps: ANSI C78.1372, wattage and burning position as scheduled, CRI 65 (minimum), and A. 30 color temperature 4000.

31 2.10 LUMINAIRE SUPPORT COMPONENTS

- 32 33 Comply with Division 16 Section "Basic Electrical Materials and Methods" for channel- and angle-iron A. supports and nonmetallic channel and angle supports.
- 34 B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as 35 luminaire.
- 36 37 Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to mount a single luminaire. C. Finish same as luminaire.
- 38 D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated, 12 gage.
- 39 E. Wires For Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 40 gage.

- 1 F. Rod Hangers: 3/16-inch-minimum diameter, cadmium-plated, threaded steel rod.
- 23 G. Hook Hangers: Integrated assembly matched to luminaire and line voltage and equipped with threaded attachment, cord, and locking-type plug.
- 4 H. Aircraft Cable Support: Use cable, anchorages, and intermediate supports recommended by luminaire manufacturer.

6 2.11 **FINISHES**

- 7 Luminaires: Manufacturers' standard, unless otherwise indicated. A.
- 8 9 1. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.
- 2. Metallic Finish: Corrosion resistant.

10 LIGHTING CONTROL DEVICES 2.12

- 11 A. Occupancy Sensors: Adjustable sensitivity and off delay time range of 5 to 15 minutes.
- 12 1. Device Color:
- 13 a. Ceiling Mounted: White.
- 14
- 15 2. Combination Sensors: Ultrasonic and infrared sensors combined.

16 2.13 SOURCE QUALITY CONTROL

- 17 Provide services of a qualified, independent testing and inspecting agency to factory test luminaires with A. 18 ballasts and lamps: certify results for electrical ratings and photometric data.
- 19 B. Factory test luminaires with ballasts and lamps; certify results for electrical ratings and photometric data.

20 PART 3 - EXECUTION

21 3.1 **INSTALLATION**

- 22 A. Luminaires: Set level, plumb, and square with ceilings and walls. Install lamps in each luminaire.
- 23 B. Support for Luminaires in or on Grid-Type Suspended Ceilings: Use grid for support.
 - Install a minimum of four ceiling support system rods or wires for each luminaire. Locate not more 1. than 6 inches from luminaire corners.
 - 2. Support Clips: Fasten to luminaires and to ceiling grid members at or near each luminaire corner with clips that are UL listed for the application.
 - Luminaires of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center 3. in acoustical panel, and support luminaires independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
- 31 C. Suspended Luminaire Support: As follows:
 - Pendants and Rods: Where longer than 48 inches, brace to limit swinging. 1.
- Stem-Mounted. Single-Unit Luminaires: Suspend with twin-stem hangers. 2.
- 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of luminaire chassis, including one at each end.

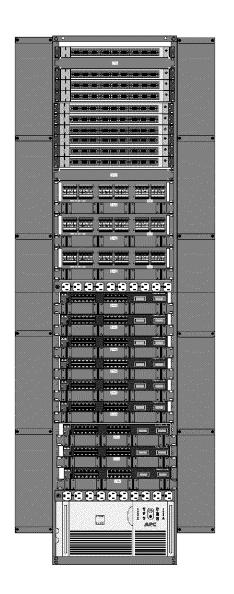
- 1 4. Continuous Rows: Suspend from cable.
- 2 D. Adjust aimable luminaires to provide required light intensities.

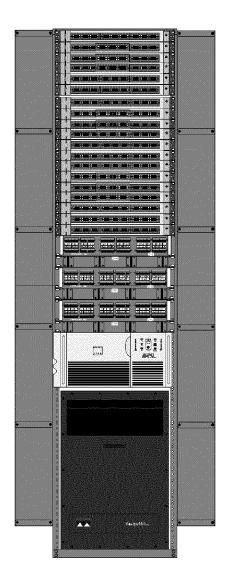
3 3.2 <u>CONNECTIONS</u>

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

6 3.3 FIELD QUALITY CONTROL

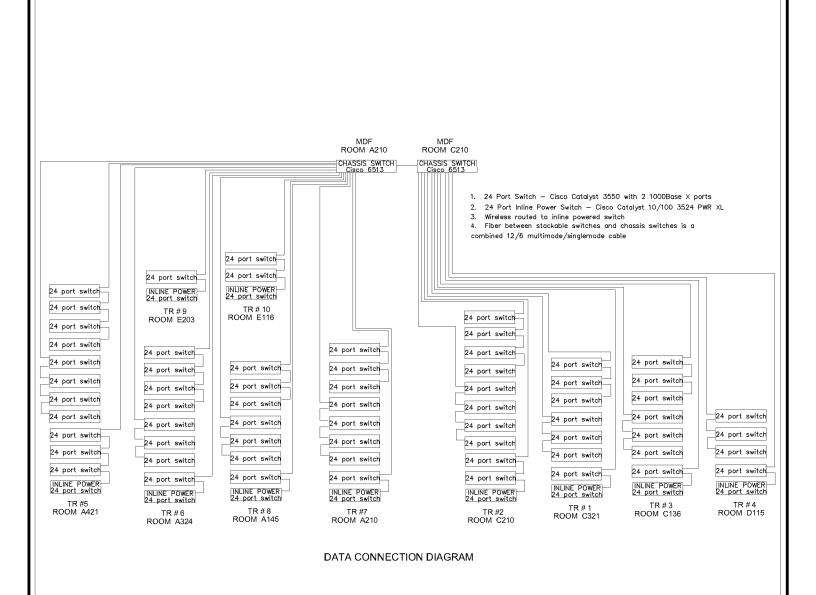
- 7 A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.
- 8 B. Verify normal operation of each luminaire after installation.
- 9 C. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify normal transfer to battery power source and retransfer to normal.
- D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.
- 13 E. Corroded Luminaires: During warranty period, replace luminaires that show any signs of corrosion.
- 14 END OF SECTION 16511





MDF A210 Rack Buildout

KCI TECHNOLOGIES, Inc.	DRAWN BY: B.J. CHECKE	D BY: B.J.
	SCALE: No Scale	
	DATE: 12/18/02	
SHW Group Inc.	JOB NUMBER	SHEET
DESCRIPTION: A210 Rack	_ F-730-48-31	IT117 -



KCI TECHNOLOGIES, Inc.	DRAWN BY: B.J. CHECKE	D BY: B.J.
	SCALE: No Scale	
	DATE: 12/18/02	
SHW Group Inc.	JOB NUMBER	SHEET
DESCRIPTION: Data Connection	_ F-730-48-31	IT120 -